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Ad Valorem on the Range

WITH such a gallant French historical background, it comes as no surprise that the Minnesota state motto is "l'etoile du nord," or "The North Star." This probably implies brilliancy, permanency and constancy. Minnesotans must have thought the motto inspired—for Nature was indeed bountiful with rich hematite ore that over the decades poured $20 millions yearly into the State treasury (if digging slackened, the tax rate went up). But a breath of uneasiness blows across the great ranges, with all this talk of imminent depletion of ore. The article in August *Harper's*, by Marvin Barloon insists that steel mills must soon migrate to coastal points to draw on foreign ores. The North Star hangs in the sky, constant and brilliant, but the Great Mesabi suddenly seems but a frail citadel of America's industrial might.

Industry always has been, and is, on the move. The constant shift of steel's center of gravity from Philadelphia, to Pittsburgh, to Chicago, and future splinter movements to the country's borders, is predicated on such overlapping variables as technology, freight rates, population shifts, war expansion, government pressure and assembly of raw material. The future weight of the raw material factor will be determined by Minnesota's encouragement, via the tax laws, in accelerating exploitation of less profitable ore bodies.

The Minnesota ranges contain many types of iron ores. For decades the companies have been scooping out the rich hematite ore (51+ pct iron) which is shipped directly to the blast furnace. This ore will be scraped clean in, at most, 15 years at present rate of consumption.

But, there are sizable quantities of untouched magnetite up on the range, which will require magnetic concentration. And, between the hematites and the magnetites there are literally enormous deposits of ores of all types and combinations, with iron contents ranging from about 19 to 30+ pct. These are the so-called Taconites. The generic term Taconite (the name of a small village on the iron range) has in itself been the cause of considerable confusion. Even Mr. Barloon, in his article, makes a brave fight but ends up in a hammerlock on himself by claiming that Taconite is not even an ore.

These Taconites will require a variety of expensive processing and treating plants. Whatever the processing technique, the final crushed and concentrated iron-rich ore necessarily must be agglomerated into lumps by one means or another—perhaps by sintering, or pelletizing or briquetting.

The U. S. Steel Corp. is expanding its Trout Lake concentrator, and both Pickands-Mather and Reserve Mining Co. are pushing plans for Taconite concentrators. It is imperative that these and other operations start shipping concentrates along with regular ore as soon as possible. Thus will expense be spread over long time periods and blast furnace problems be less difficult. For there is no practical experience on blast furnace burdens of over 30 pct sinter, and a "twelfth hour" 100 pct sinter burden might demand stiff price increases for finished steel.

Minnesota's *ad valorem* tax (on iron reserves in the ground) is particularly irksome and discouraging to long-range planning. Realistic modification of this tax may well determine whether the iron ore problem remains a cloud on the horizon no bigger than a man's hand, or brews a storm influencing the economy of the entire country.

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► Typical of the long distance conversion deals some manufacturers resort to is one involving 1500 miles of freight. The company bought somewhat more than 1000 tons of ingots, shipped them 350 miles for conversion to slabs which were shipped 700 miles for rolling. The cold-rolled sheet then traveled another 450 miles before it reached the fabricator's plant.

► At least one steelmaker is studying substitution of silicon carbide for aluminum as a ladle deoxidizer in rimmed steels. Silicon carbide is cheaper than shot aluminum and if the pickup of silicon is not too great and rimming action is good, silicon carbide may be adopted as standard practice.

► A new type melting furnace for plastics is reported to cut heating time in half. It holds the entire bath to plus or minus 5°F and keeps the top of the open dip tank free of crust or scum. Application is mainly for plastics used in coating and preserving metal parts.

► Latest wrinkle in aluminum permanent mold casting is a gas-fired holding ladle that keeps the metal at the proper pouring temperature and automatically tilts and fills the mold which is clamped to an opening in the ladle.

Shrinkage or pipe is restricted to the sprue or molten bath and the molds vent themselves in filling to preclude entrapped gases. The entire pouring cycle is under automatic control, variable to meet a wide range of conditions.

► Swedish iron powder, which now dominates the market for high quality powder at low cost, will soon be in competition with a new high quality reduced iron powder that will sell initially at 15¢ per lb. When plant costs are amortized it is believed the new powder can be sold at well below the current price for Swedish iron powder.

► An all-basic openhearth roof tried by large steel producer now has lasted 180 heats and lost but 1 to 2 in. in thickness. This furnace has been used on oxygen experiments and may be the answer to roof troubles under such melting conditions. It is estimated that the cost of an all-basic design is five times that of conventional openhearth refractories.

► The National Bureau of Standards has perfected a new thermometric standard which uses the freezing point of benzoic acid as a fixed temperature. The device, called a benzoic acid cell, should prove a more rapid and convenient method of calibrating platinum resistance thermometers and thermocouples.

► Blast furnace operators in the Buffalo region are concerned because lake ore shipments got off to a late start this spring and may be interfered with by grain shipments this fall.

► An 8-in. natural gas pipeline will be built from Toulouse to Bordeaux, France, a distance of 155 miles. It will supply gas for industrial as well as automotive use.

► A newly developed nonmetallic powder can be compacted and magnetized to have a coercive force equivalent to that of Alnico II of the same weight. These magnets are said to weigh only a third as much as Alnico and their cost is much lower.

► Barter is becoming increasingly important to German industrial life. The brick works gives a few bricks to each man at the end of the week and the machine shop allows each man to do a little work on his own to make some article that will permit him to barter with a farmer. Manufacturers themselves are finding direct barter a more satisfactory method of obtaining raw materials than the sagging "official channels."

► The use of Air Force personnel to test fly the Bell XS-1 supersonic plane will save the government about $150,000 in test pilot fees.

► Britain's first atomic pile, known as Gleep (graphite low energy experimental pile) has just started at the Atomic Energy Research Establishment, Harwell, Berks. It has been built for experimental work in nuclear physics, but it will also be used temporarily for producing small quantities of radioactive materials for biological and medical research.

► The Russians report "invention" of a method of making super-transparent glass. The technique involves application of a very thin film on the surface of the glass thereby reducing light reflection. This is expected to come as quite a surprise to the Americans who invented this process about 10 years ago.

FIG. 1—Checking radioactivity with Geiger-Muller counter in hood used for melting experiments with radioactive tracers.

Radioactive Tracers In Metallurgical Research

° ° °

By E. S. KOPECKI
Metallurgical Editor,
THE IRON AGE

° ° °

Use of radioactive materials is arousing considerable interest among metallurgists as a new means of obtaining greater knowledge of rates and mechanisms of metallurgical reactions in molten and solid metals. Outlined herein is a research program under way at Carnegie Institute of Technology. Representing one of the first large-scale uses of radioactive tracers in metallurgy by a university laboratory. Highlighting the project is an intensive study of rates of diffusion, one of the controlling factors in reactions in the solid state.

WITH most of its senior staff participating, the Carnegie Institute of Technology Metals Research Laboratory has been engaged in a broad integrated fundamental research program designed to add to the knowledge of the basic science of metallurgy. Operating as a participating unit of an overall Office of Naval Research program, the Carnegie program has been and is concerned, primarily, with the rates and mechanisms of metallurgical reactions in molten metals and in solid metals.

In the section on liquid metals, efforts have been directed mainly toward a study of reactions in steelmaking, and, particularly, the measurement of activities of constituents in liquid metals and slags and the mechanism of reaction across a slag-metal interface. The work of the solid metals section has been primarily concerned with the rates of diffusion and concepts of interatomic forces and activities in solid solutions which may be inferred from diffusion data.

Of particular interest is the important use of radioactive tracers in one of the first large-scale uses in metallurgy, by a university laboratory, of radioactive material.

Tracers have been used in seeking the sulfur transfer coefficients and the calcium deoxidation constant in experiments on the reactions across the slag-metal interface, in the work on the self diffusion of iron, in studies of the mechanism of scaling of iron, and in efforts to examine microsegregation. It is planned to use them even more extensively in further research.

The overall Carnegie project is spread over several lanes of research embracing the fields of physical and process metallurgy, with both of these fields broken down to numerous subdivisions as indicated in the organization chart, fig. 2.

The section on physical chemistry of steelmaking is directing part of its efforts toward a study of mechanisms and kinetics of slag-metal interface reactions, in an attempt to determine the rates and mechanisms whereby elements, which are soluble in both slag and metal, cross the interface between the two phases. Sulfur and oxygen are two such elements which are of fundamental importance to steelmaking; consequently they were singled out as the first to be studied.

A good start has been made at determining rate constants for sulfur transfer from slag to metal and from metal to slag, but a finished research in this phase of the program is not expected until the mechanism of the transfer of sulfur across a slag-metal interface has been worked out with the aid of radioactive sulfur. When these experiments have been concluded, it is expected that the work will be extended to the problem of oxygen transfer, utilizing vacuum fusion apparatus and the melting and sampling techniques developed for the sulfur study.

With radioactive calcium already in the laboratory, work is under way for determining the solubility of calcium in liquid iron and the calcium-oxygen equilibrium in iron. This is an excellent illustration of the application of radioactive tracers to a research problem which cannot be solved in any other way. Classical methods of chemical and spectrographic analysis are not sensitive enough to detect any solubility of calcium in steel, but extremely low concentrations of calcium may be detected if some of the calcium atoms are radioactive. Radioactive calcium will, of course, behave chemically the same as ordinary calcium and the radioactivity will not be altered by high temperatures.

A slag is made up from radioactive calcium carbonate together with ordinary silica and alumina. Working in a ventilated hood, see fig. 1, this slag is placed over liquid iron saturated with carbon in a graphite crucible. It is expected that a trace of calcium may be reduced from the slag and enter the metal. The amount of calcium can be determined by suitable calculations from the rate of radioactive disintegration as measured by a Gieger-Muller counter. Fig. 3 shows the scalers and the lead chamber that houses the Gieger counter and sample being counted.

Several experimental difficulties remain to be solved before any results can be reported. Experiments are being made under reducing (blast furnace type) slags, and the effect of changes in slag basicity is being investigated. This portion of the program is based on the assumption that the solubility of calcium in iron will be great enough to be detectable by radioactive counting methods. Should the activity be too low to measure, it is expected that the negative result will still be of scientific importance, since it will enable some estimate to be made of the maximum solubility of calcium in iron.

In the work of the molecular constitution of slags, a study of ionic properties is being conducted to help elucidate the constitution and properties of slags. In attacking this phase of the program, use is made of electromotive force measurements, ionic mobility studies, and conductivity studies. In the past, the Carnegie staff developed a carbon-silicon carbide couple which provided a measure of SiO_2 activity in the slag; consequently, the laboratory expects some success in further studies being conducted along these lines.

As a first step in investigating the nature and

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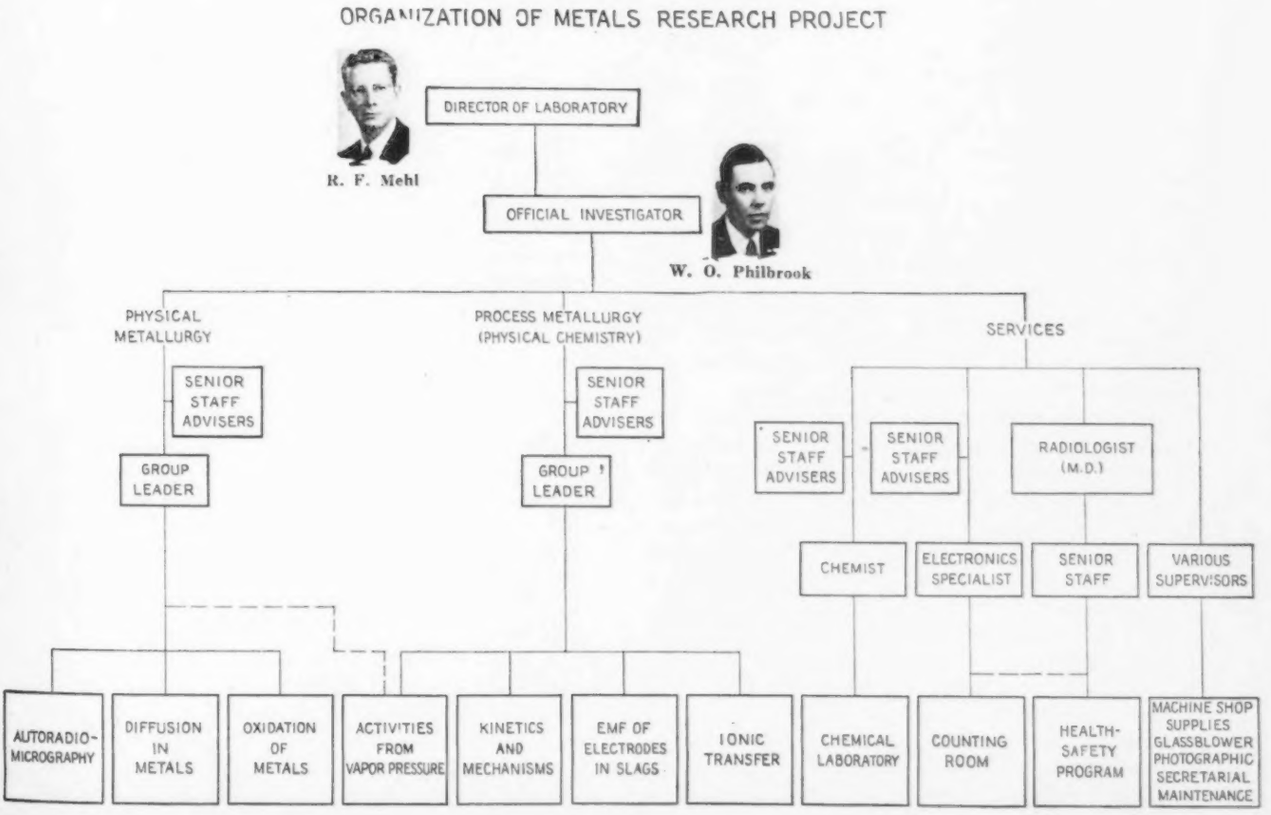
FIG. 2—Organization of Carnegie Institute Metals Research Laboratory research project.



mobility of ions in liquid slags and metals, experiments have been set up to determine whether an impressed electrical field across a slagmetal. interface will alter the distribution of sulfur between slag and metal. It is proposed to continue studies of this sort, extending the work to the distribution of oxygen between slag and metal, on one hand, and the mobility of ions within the slag phase only, on the other hand.

Also scheduled for the near future is the direct determination of the activities of various elements in liquid slags and metals by vapor pressure measurements, using radioactive tracers, where available, to facilitate analysis. The method will involve condensation on a cold target of an atomic beam streaming through a pinhole orifice in a crucible containing the liquid slag or metal at high temperature, the entire operation being conducted under high vacuum. In cases where the vapor pressures become too high for application of the atomic beam technique, the saturation or "dew point" method, such as used for vapor pressures of zinc in brasses, can be employed. Slow delivery of certain parts of the intricate apparatus for the atomic beam method has delayed these experiments until now.

In the physical metallurgy section, which is working on diffusion of metals, the diffusion measurements under way or anticipated were selected for one of five purposes: (1) To provide data for the analysis of the kinetics of the austenite-pearlite reaction; (2) to substantiate the theoretical studies on binary diffusion recently made on this project[1]; (3) to extend present ideas on diffusion into ternary systems; (4) to amplify existing information in systems of interest to the metallurgist which dispay properties are not entirely metallic; and (5) to study diffusion in structurally analogous systems as a basis of correlation of diffusion with other physical factors. Some of the diffusion apparatus is illustrated in fig. 4.

In the work of the kinetics of the austenite-pearlite reaction, fundamental diffusion data being sought are the rate of self diffusion of iron in both the alpha and gamma ranges, and the rates of diffusion of carbon in gamma iron. At the present time the experimental determination of self-diffusion in both alpha and gamma iron using radioactive iron as a tracer, is almost complete. It is planned, in this phase of the program, to continue work on theoretical studies on the mechanism of austenite decomposition.

The section dealing with the theory of binary diffusion in solid metals plans to study the gold-silver system to seek confirmation of a theory developed on the project.[1] It is believed that the diffusion coefficient is invariant with composition if activities rather than concentrations are used in the diffusion equation, and a critical test of this theory would be best provided by a system of two completely miscible metals which can be obtained in very pure form and which are not susceptible to oxidation. Hence, the desire for work with the silver-gold alloys.

In delving into the theory of diffusion in ternary alloys, plans have been made to work on a representative of each of three possible types of systems in which (1) all elements are substitutional, (2) one constituent is interstitial, and (3) two components are interstitial. The Cu-Ni-Zn system is an attractive example of the substitutional type of alloy because data already exist for diffusion in the binary systems, but difficulties in preparation of the alloys (zinc boils at 980°F below the melting point of nickel) may force selection of some other system. The Fe-Si-C system will be explored as representative of the second type of alloy, and it is expected that Fe-C-B will provide the example with two interstitial components.

FIG. 3—Counting radioactive samples for metallurgical research.

Because of the extraordinarily strong and mysterious influence of boron on the hardenability of steel, a preliminary determination of the effect of boron on the diffusion of carbon in alpha iron is already in progress. The Fe-C-B system also falls within the scope of other research and the projects will be coordinated to supplement one another in such a way as to study this very interesting system without duplication of effort.

In fact, the full scope of the laboratory's research on metallic diffusion can best be appreciated, not from this project alone, but from the coordinated program which embraces work under several sponsored projects and doctorate theses. Most of this work, which is in progress

or scheduled to start during the coming year, is outlined as follows:

(A) Diffusion of iron (using radioactive iron).

(1) Rate of self-diffusion of iron in alpha and gamma iron.

(2) Effect of carbon concentration on self-diffusion of iron.

(3) Rate of surface self-diffusion of iron.

(4) Rate of diffusion of iron in every dilute solution in copper, nickel and cobalt.

(B) Diffusion of other elements in iron.

(1) Effect of carbon concentration on the rate of diffusion of carbon in gamma iron.

(2) Determination of rate of diffusion of hydrogen, nitrogen and boron in alpha iron. Effect of these elements on diffusion of carbon in alpha iron and effect of carbon on the diffusion of these elements in alpha iron.

FIG. 4—Apparatus for controlling atmosphere and temperature for diffusion specimens.

(3) Determination of rate of diffusion of hydrogen and boron in gamma iron. The effect of these elements on diffusion of carbon in gamma iron and effect of carbon on the diffusion of these elements in gamma iron.

(4) Determination of the rate of diffusion of chromium and silicon in alpha and gamma iron, the effect of carbon on the rate of diffusion of these elements in alpha and gamma iron, and the effect of chromium and silicon on the diffusion of carbon in alpha and gamma iron.

(C) Studies on the mechanism of diffusion in binary metallic solid solutions.

(1) The influence of lattice vacancies on diffusion, using nickel- aluminum and cobalt-aluminum alloys in which the number of vacancies may be controlled.

(2) Precise study of interface movement in metallic diffusion, the "Kirkendall Effect," and quantitative determination of counter-current flow in diffusion, especially in the brass system.

(3) Nature of the grain boundary and its importance in diffusion; penetration of bismuth into the grain boundaries of solid copper as related to the relative orientations of adjacent copper crystals and other variables.

(4) Optical (reflectivity) study of surface diffusion in the silver-copper system.

(5) Interdiffusion and self-diffusion of gold and silver in gold-silver alloys and correlation with activities.

(6) Other theoretical studdies on the mechanism of solid diffusion based on reevaluation of published and unpublished data already available.

(D) Studies on diffusion in ternary, nonferrous systems, copper - nickel - zinc or copper-nickel-tin.

The use of radioactive tracers at the Carnegie laboratory has made it possible for the staff to study diffusion mechanisms in oxide films and thereby to investigate the processes of the scaling of metals. In working with iron, for example, a very thin layer of radioactive iron is electroplated on a polished surface of pure iron. The metal is then oxidized under controlled atmosphere and temperature, and the scale formed is stripped off in very thin layers by acid etching. The distribution of radioactive iron through the scale yields information as to whether the scale builds up by diffusion of oxygen to the iron or of iron to the oxygen.

It has already been found that the mechanism of oxidation is more complex than earlier investigators had suspected. The work has been expanded to include scaling under conditions to

produce all the possible combinations of single and multiple iron oxide layers. Fig. 5 shows part of the apparatus used to produce controlled atmospheres for selective oxidation. It is planned to extend this work to the scaling of other metals where tracers are available.

[1] *C. E. Birchenall and R. F. Mehl, "Thermodynamic Activities and Diffusion in Metallic Solid Solutions," Metals Technology* 14, *June* 1947, *T. P.* 2168 (*AIME*).

[2] *C. E. Birchenall, "Interaction and Structure in Copper-Zinc Alloys," Metals Technology* 14, *June* 1947, *T. P.* 2169 (*AIME*).

FIG. 5—Taking a reading on a gas burette.

Supplementing the work in diffusion will be a determination of the activity of zinc in alpha and beta silver-zinc alloys by vapor pressure measurements. Since diffusion data are expected to become available for this system, it will then be possible to correlate diffusion with activities, and to relate activities to short-range ordering, to verify conclusions drawn earlier in the project from the structurally analogous brass system.[2] Direct evidence on short-range ordering should be obtained by X-ray methods for the silver zinc system, whereas copper and zinc atoms have too nearly the same scattering power to make this independent certification of ordering possible for the brasses.

The study of the mechanism of reactions in the solid state is hampered by the absence of techniques for determining concentration gradients on a submicroscopic scale. For example, the decomposition of austenite to form pearlite would be better understood if one could know the carbon concentration gradients in the austenite immediately ahead of the advancing front of pearlite, and across the newly-formed lamellas. High carbon steels containing radioactive carbon have been prepared by carburizing pure iron, using $BaCO_3$ containing radioactive carbon as the energizer. Efforts are being made to develop "autoradiomicrographic" techniques with the use of extremely finegrained photographic plates. At the moment, it appears that the resolution obtainable will not be great enough to be useful in the study of the microscopically fine details of austenite decomposition products.

Handling of radioactive materials used in the project, naturally presents a potential health hazard, and requires that suitable safeguards be enforced. Fortunately, there is comparatively little danger involved in intelligent handling of the tracers used in this metallurgical research because of the small quantities used and the low level of activity of the samples. In fact, it has proved to be a greater problem to devise means of counting low energy beta rays than to provide proper protection of personnel from radiation.

Health regulations provide for periodic blood counts, medical examination if indicated, and rotation of personnel where necessary to minimize the cumulative effect of irradiation. The rules specify the minimum requirement for checking hands, body, clothing and working areas for radioactive contamination, together with maximum permissible limits for such counts. All counts and exposure meter readings must be recorded. It is also necessary to include instructions for decontamination or disposal of contaminated articles or wastes, to outline first aid for injuries, to place restrictions on eating places, and to caution regarding smoking habits to avoid inadvertent ingestion of radioactive materials.

Although the Carnegie program is intensive and organized into specific channels of research as outlined above, flexibility is being maintained so that emphasis can be shifted to allow for unexpected results in the experiments and concurrent developments in the metallurgical research field at large.

It is believed by the research staff that the information obtainable from this program will help in providing a sound basis for the re-evaluation of steelmaking reactions. And, with the thought in mind that rates of diffusion have been very little explored, the staff is aiming at exploitation of this field of science so that this, one of the controlling factors in reactions in the solid state, may be better understood and utilized.

PRACTICAL ASPECTS OF

Bainitic Hardening Of High-Speed Steel

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and

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Improvements in performance qualities of high-speed steel cutting tools, made possible by the development of a new method of heat treating, are revealed in this article by the originators of the process. The metallurgical aspects of the new method, called bainitic hardening, are discussed and compared with conventional hardening practice, in this first part of a two-part article. Bainite formation data are presented, based on microstructural, specific volume, length change and hardness test methods.

THE performance of cutting tools of high-speed steel is remarkably improved by a new method of heat treatment which the authors call *bainitic hardening*. Basically, bainitic hardening differs from conventional hardening in the kind of structure developed in the steel. The structure developed by bainitic hardening consists mainly of a constituent called tempered bainite instead of the usual tempered martensite, although the final hardness is about the same. A practical difference is that the new treatment takes a long time compared to conventional hardening.

The following is a typical bainitic hardening cycle; (1) heat in the regular manner, (2) interrupt the quench at 500°F and hold for 4 hr, (3) cool to room temperature, (4) reheat to 1050°F and hold 4 hr, (5) cool to 500°F and hold for 4 hr, (6) cool to room temperature, and (7) double temper in the conventional manner. The need for carrying out each of these steps will be discussed in detail later.

Consider first how the overall treatment makes a high-speed tool perform better. There are two possible explanations. Either the tempered bainite formed during the treatment is itself tougher, than tempered martensite, or, as Bancroft suggested in his discussion of the paper by Baer and Payson[1], the heat-treating cycle that introduces the bainite necessarily reduces the stress in the tool. In other words, it is either the end or the means by which that end is accomplished which is responsible. The authors are inclined to believe that the latter is the better explanation.

Stresses exist in hardened tool steels because the hardening reaction produces a marked expansion at low temperatures where the steel has little plasticity and, consequently, cannot readily adjust itself. Distortion and cracking are evidence of the tremendous stresses in hardened tool steel. If these stresses are not relieved sufficiently by tempering, they may also cause a premature service failure.

Although hard tools that must also be tough

Additional articles describing various heat-treatment procedures for high-speed steel have appeared in THE IRON AGE *as follows: "Heat Treatment of High-Speed Steel," Feb. 28, 1946, p. 42; Mar. 7, p. 52; Mar. 14, p. 68; Mar. 21, p. 61; Mar. 28, p. 55. "An Appraisal of Subzero Hardening of High-Speed Steel," July 26, 1945, p. 54; Aug. 2, p. 64.*

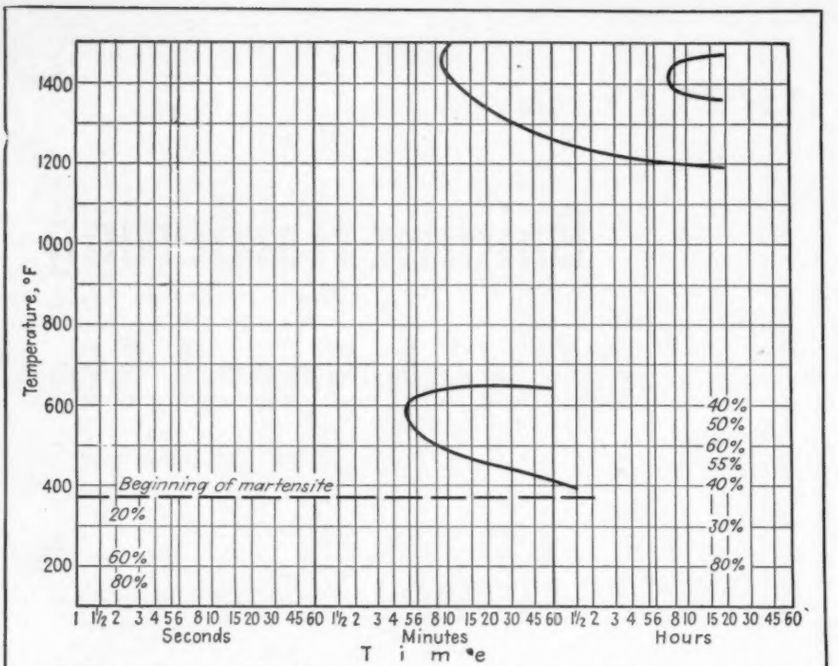

FIG. 1—TTT curve for 18-4-1 high-speed steel. Austenitizing temperature 2350°F; critical temperature (Ac_1) 1545°F; prior condition, annealed.

must have low internal stresses, other steels sometimes are improved by stresses. For example, Almen[2,3,4] has shown that since fatigue failures are the result of tension stresses on the surfaces of metals, the fatigue strength of machine parts can be increased by intentionally introducing compressive stresses. Shot blasting, tumbling, heat treating, etc., compress the regions that are stressed in tension by operating loads.

Being a cause of distortion, cracking, and inferior service performance, stresses in tool steels have so worried metallurgists, heat treaters, tool engineers, and others that they have devised circumventions for minimizing these stresses. Timed or interrupted quenching, hot quenching or martempering, and austempering are examples.

Timed or interrupted quenching, and hot quenching or martempering[5], all have the same fundamental purpose—to cool the steel rapidly from the austenitizing temperature to some intermediate temperature, then to cool relatively slowly (as in air) from the intermediate temperature through the hardening range where the expansion occurs. Such a procedure reduces internal stresses because the expansion is made to take place more slowly during the air cool and more uniformly throughout the piece.

Austempering[6,7] is a type of heat treatment in which hardening results from the formation of bainite instead of martensite. The austenitized steel is quenched into a liquid bath at a temperature a little above that at which the steel would begin to harden with a regular quench. The work is held at temperature long enough for the transformation of austenite to bainite to be completed, not just until all parts of the piece reach the bath temperature. Austempering reduces internal stresses because it makes the expansion occur at a relatively high temperature where the steel is more plastic and because thermal gradients are averted. Moreover, steel being austempered does not expand so much, since bainite is more dense than untempered martensite. Davenport, Roff and Bain[8] have further explained the superiority of high carbon steels austempered to rather high hardnesses. They state that austempering eliminates microcracks produced within the individual austenite grains by stresses resulting from conventional hardening.

High-speed steel being particularly susceptible to the formation of high internal stresses, has become a natural application for a hot quench or an interrupted quench[9-12]. Even these methods, however, cannot repress the formation of high stresses, for the hardening takes place unalterably through a low temperature range in which

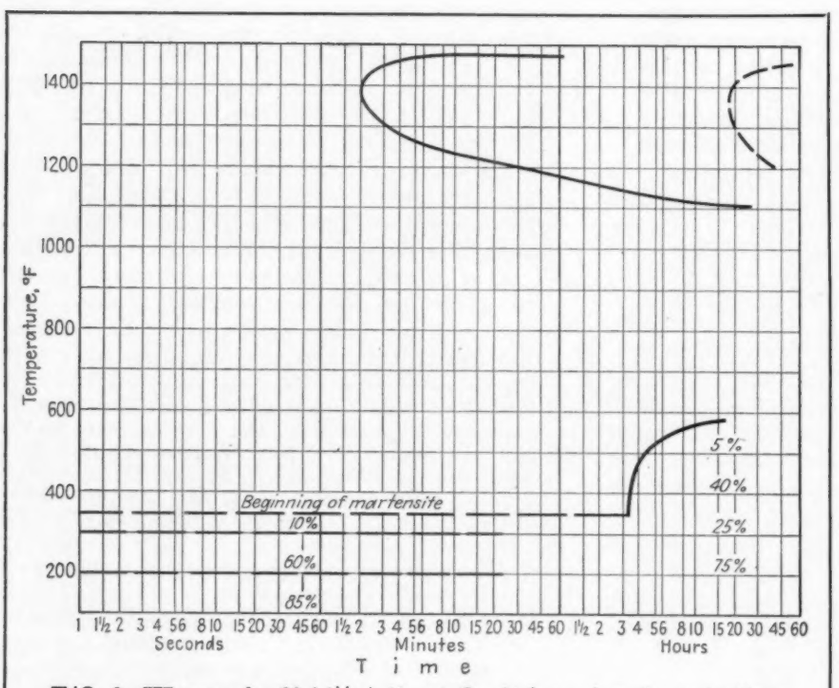

FIG. 2—TTT curve for 20-4-1½ + 12 pct Co, high-speed steel. Austenitizing temperature 2400°F; critical temperature (Ac_1); prior condition, annealed.

the steel cannot readily yield to the attendant expansion. Nor can austempering be applied to high-speed steel because the transformation virtually stops when only about 50 to 60 pct bainite has been formed. Such a steel containing about one-half bainite and one-half austenite, has a low hardness, and a tool treated in this way is obviously in no condition to be used.

Nevertheless, it is possible to introduce large amounts of bainite in high-speed steels by using the new procedure described in this article.

Formation of Martensite

Before the bainite reactions are discussed it would, perhaps, be well to review briefly what happens during conventional hardening of high-speed steel. Only brief statements will be made because the changes have been traced in detail by Cohen and Gordon[13].

In the austenitized condition, that is, at the high temperature before the quench, high-speed steel consists of a mixture of austenite and undissolved carbides. As it cools in the quench, the austenite contracts uniformly until a temperature of about 400°F is reached. At this point martensite begins to form, and an expansion occurs because martensite is less dense than austenite. The quantity of martensite and the degree of expansion increase as long as the cooling continues. If cooling is stopped, hardening and expansion also stop. By the time room temperature is reached, about 75 to 85 pct of the austenite has transformed to martensite and the steel is hard, stressed, and brittle. The first temper then relieves the hardening stresses to some extent, tempers the martensite, and conditions the residual austenite. The conditioned austenite then transforms to fresh martensite during cooling from the tempering temperatures. This last accomplishment introduces new stresses, necessitating another temper. The tempering process has been clearly described by Cohen and Koh[14].

Formation of Primary Bainite

If cooling is stopped just before hardening sets in, bainite will begin to form as in austempering. How soon the reaction starts and how much bainite can be formed is indicated by the TTT curve for the steel in question. Thus, the TTT curve for 18-4-1 high-speed steel, fig. 1, shows that at 500°F the bainite reaction starts in about 8 min and that 60 pct of the available austenite transforms in 16 hr.

This is not equivalent to saying that 60 pct bainite forms, because the austenite formed by heating at 2350°F did not constitute 100 pct of the steel by volume. Gordon, Cohen and Rose[12] state that the amount of residual carbide in 18-4-1 high-speed steel, austenitized at 2350°F, is 5 to 7 pct by volume. In other words, austenite available for transformation constitutes about 94 pct of the structure at 2350°F. Therefore, when 60 pct of this austenite transforms, the bainite formed constitutes 60 pct, x 0.94, or 56 pct of the total structure. All references to percentages of bainite, martensite, austenite or residual carbides are based on the

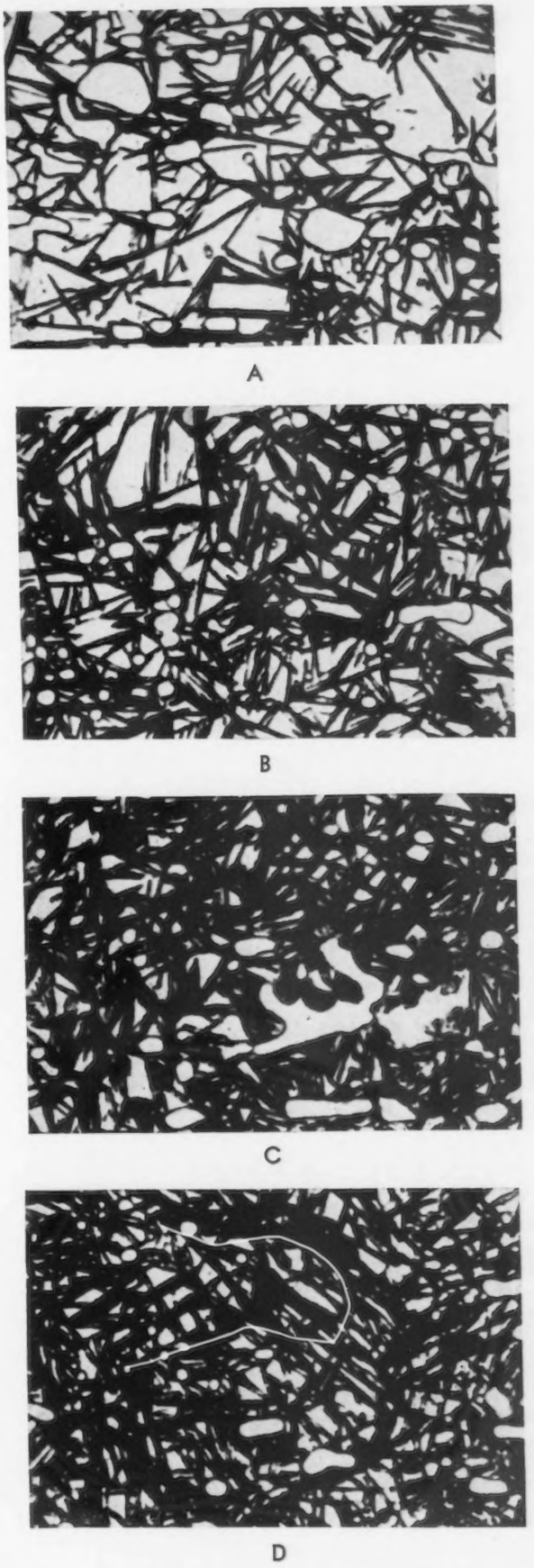

FIG. 3—Progress of bainite formation in 18-4-1, austenitized at 2350°F and transformed at 500°F for (A) 1 hr, (B) 4 hr, (C) 8 hr, and (D) 15 hr. Etched in 5 pct nital for 6 min. Photomicrographs show 25, 50, 55 and 60 pct bainite, respectively. X2000.

TABLE I

Effect of Primary Bainite on the Hardness of 18-4-1 High-Speed Steel

Holding Time at 500° F, Hr	Amount Primary Bainite, Pct	Rockwell "C" Hardness		
		Air Cooled From 500° F	Tempered at 1050° F	
			2 hr	2 + 2 hr
0	0	65.6	65.1	64.8
1	25	65.5	64.5	64.1
2	40	61.2	64.5	64.2
4	50	57.8	64.8	64.5
8	55	57.4	64.5	64.2
12	60	57.2	64.4	64.1

total structure of the steel and have been rounded off to the nearest 5 pct.

Most other types of high-speed steel are similar to 18-4-1 in their bainite-forming characteristics. A notable exception is 20-4-1½ + 12 pct Co. The TTT curve for this steel, fig. 2, shows that no bainite forms in the first 4 hr at 500°F, and only about 5 pct bainite in 16 hr. At 400°F the bainite reaction starts in about 3½ hr and progresses more rapidly than at 500°F, but it still takes 16 hr to form about 40 pct bainite. The other cobalt high-speed steels such as 14-4-2 + 5 pct Co, 18-4-1 + 5 pct Co., and 18-4-1 + 8 pct Co, do react like 18-4-1. The following discussion of 18-4-1 therefore applies as well to other grades.

Four kinds of tests—microstructural, specific volume, length change, and hardness—were used to trace the bainite reactions. The metallographic examinations were made following the familiar quench-temper procedure[15]. Samples were austenitized at 2350°F for 2 min, precooled by a 10-sec quench in lead at 1100°F, and transferred to a salt pot at 500°F, where they were held for 1, 2, 4, 8 and 12 hr, respectively. At the end of the holding periods the samples were transferred directly to a lead bath at 1050°F where they were tempered for 2 hr to assure that the bainite formed at 500°F would be dark etching.

Two other sets of samples, one for specific volume measurements and one for hardness tests, were also held at 500°F for 1, 2, 4, 8 and 12 hr periods, but these were air cooled to room temperature at the end of the holding periods. The specific volume measurements were made by the method described by Fletcher and Cohen[16].

Length change pieces, ¼ in. in diam by 4 in. long, were transferred hot from a Globar furnace at 2350°F to a dilatometer of the type described in ASTM specification B95-39. They were held in the apparatus at 500°F, and the resulting expansion with time was noted. At the end of the specified holding period the pieces were cooled to room temperature at a rate not greater than 10°F per min.

The data obtained are summarized in tables I and II. The photomicrographs in fig. 3 and the curve in fig. 4 illustrate the progress of the bainite reaction. The relation shown in fig. 4 between pct austenite transformed and time of holding at 500°F, is based on length change measurements. In Appendix 2* and in a paper by Gordon, Cohen and Rose[12], more comprehensive discussions of the conversion scheme used will be found. For the present, all that needs to be said is that a total expansion of about 0.0070 in. per in. of length would take place at 500°F if it were possible to convert all of the available austenite of 18-4-1 to bainite at that temperature. Consequently, the amount of austenite transformed to bainite in 18-4-1 during a given holding period at 500°F could be calculated by dividing the observed dilation by 0.0070 and expressing this proportion as a percentage.

TABLE III

Effect of Time At 500°F on Ms Temperature of Remaining Austenite

Time, Hr	Approx Ms Temp., °F
0	400°
½	375°
1	320°
2	160°
4	Below —40°

TABLE II

Effect of Time at 500°F on Constitution of 18-4-1 High-Speed Steel At Room Temperature

Holding Time at 500° F, Hr	Specific Volume, cc per g	Residual Carbide, Pct	Bainite, Pct (From Fig. 4)	Martensite, Pct (Calculated[1])	Austenite, Pct (Calculated[1])
0	0.11547	5	0	75	20
1	0.11530	5	25	45	25
2	0.11483	5	40	20	35
4	0.11452	5	50	0	45
8	0.11460	5	55	0	40

[1] Calculations described in Appendix I.*

* *Appendix I, "Calculation of Constitution from Specific Volume Measurements," and Appendix II, "Calculation of Constitution from Length Change Measurements," are not included herein, but will be made available to readers upon request.*

Fig. 4 shows the bainite reaction proceeding rapidly at first, decreasing with time, then virtually stopping, although there is still about 40 pct of the austenite left untransferred. Obviously, the most practical holding time at 500°F is about 4 hr. The little bainite formed after 4 hr is not worth the time.

The hardness results in table I are interesting. They seem to indicate that bainite is much softer than martensite because as the time at 500°F increases, the amount of bainite increases, but the hardness decreases. Yet when the samples are double tempered, their hardness is practically the same as that of the sample

quenched and tempered in the conventional manner. Apparently, then, tempered bainite has about the same hardness as tempered martensite. The authors tried to measure the hardness of bainite which had not been tempered, with a microhardness tester, but were unsuccessful owing to the fact that the bainite was always intimately mixed with some other constituent—austenite, for example. However, it does seem reasonable to assume that untempered bainite is softer than untempered martensite.

Even if this assumption is correct, the difference could scarcely be great enough to account for the anomalous hardnesses. The real explanation is that while the amount of bainite at 500°F does increase, the amount of bainite *plus martensite* at room temperature decreases; in other words, at room temperature the amount of the third constituent, austenite, increases. This is evident from table II. Only about 20 pct austenite was present at room temperature in the sample quenched directly from the high heat temperature, whereas more than twice as much austenite, or about 45 pct, was present in the sample held at 500°F for 4 hr before it was cooled to room temperature (See Appendix 1*.)

This increase in the amount of austenite at room temperature which results from holding certain steels for a time at some higher temperature is due to a phenomenon called austenite stabilization. It has been observed by Gulyaev[18], by Gordon, Cohen and Rose[12], and others, in 18-4-1 high-speed steel, and by Troiano[19] in high chromium steels. For example, Gordon, Cohen and Rose[12] quenched high-speed steel to 600°F and held it there for 2 hr, during which time about 40 pct of the austenite transformed to bainite. The remaining 60 pct austenite, though available for transformation, became stabilized to such an extent that none of it transformed when the cooling was resumed. They found also that stabilization had set in during a 24-hr holding at 500°F.

Whether shorter holding times at 500°F would have the same effect, was determined with the dilatometer. Samples, which had been heated in the usual way for hardening, were held in the dilatometer at 500°F for different lengths of time before cooling them to room temperature. If any of the available austenite transformed on cooling, an expansion occurred. At the moment of such expansion, the temperature of the steel was noted, yielding the data shown in table III. These data show that the longer the steel is held at 500°F, the lower is the temperature at which the remaining austenite starts to transform when the cooling is continued. A 4-hr holding depresses this temperature so far below room temperature that none of the available austenite will normally transform. This fact confirms the calculations based on the specific volume data, table II, in that no martensite is present in samples cooled to room temperature after a 4-hr sojourn at 500°F.

All the preceding discussion concerned 18-4-1 high-speed steel, which had been heated to 2350°F for 2 min. Since in the commercial heat treatment of high-speed tools austenitizing conditions vary, it was of practical interest to know how such variations affect the bainite reaction.

Several metallographic tests were made in the manner described previously. The results indicated that an increase in the austenitizing temperature or time retards the primary bainite reaction. Although variations between 2300° and 2350°F, and between 1 and 8 min make little difference, a higher temperature or a longer time at 2350°F, 15 min for example, definitely cuts down the amount of bainite which forms in a given holding time.

The preceding discussion of the primary bainite reaction in 18-4-1 may be summarized as follows:

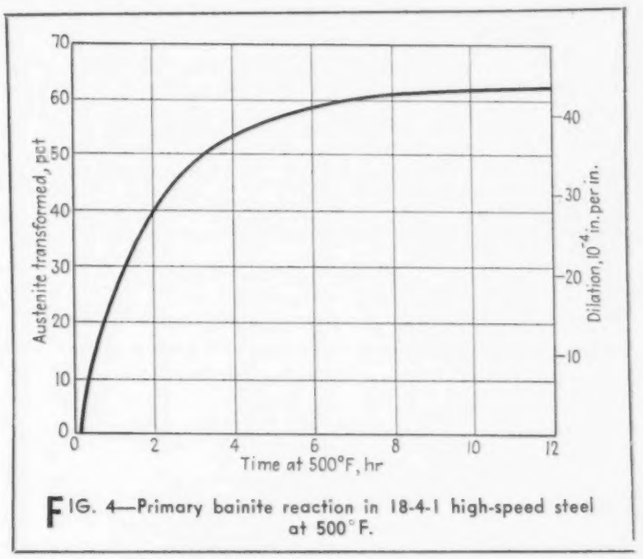

FIG. 4—Primary bainite reaction in 18-4-1 high-speed steel at 500°F.

(1) Quenching to 500°F and holding there for a matter of hours causes bainite to form from austenite.

(2) While bainite is forming, austenite becomes sluggish, so that; (a) the bainite reaction slows up and virtually stops, although there is a considerable amount of austenite still untransformed, and (b) this austenite can be cooled to room temperature without any martensite being formed.

(3) The most practical time to hold at 500°F is about 4 hr. Little additional bainite can be produced by prolonging the holding period.

It should be mentioned that an earlier article[1] contains further data on the primary bainite reaction in 18-4-1, 18-4-1 + 5 pct Co, and 6½-5-2, high-speed steels. Some of the 18-4-1 data in the former article do not agree with those in this article showing the amounts of bainite formed during certain times at 500°F. The amounts in the former paper were based entirely upon metallographic examinations and are therefore less accurate than those in this paper determined by the more precise dilatometric and specific volume methods.

Resistance of Bainite to Softening

Perhaps the most important property of a conventionally hardened high-speed tool is its

ability to resist softening when it becomes heated in use. Whether bainitically hardened 18-4-1, 18-4-1 + 5 pct Co and 6½-5-2 high-speed steel possessed this property was established by hardness tests. Samples made partly bainitic by 4, 8 and 12 hr holding periods at 450°, 500°, 550° and 600°F were first double tempered in the regular way with a sample that had been oil quenched. Additional tempers at 1050°, 1075°, and 1100°F followed by hardness tests proved (table IV) that partly bainitic high-speed steel resists softening just as well as the same steel composed entirely of martensite.

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In a subsequent issue, the authors will present laboratory and service cutting test data from the standpoint of continuous cutting and interrupted cutting.—Ed.

TABLE IV

Resistance of Bainite and Martensite to Softening Upon Repeated Tempering

Heat Treatment	Rockwell "C" Hardness		"Rc" Hardness After Additional Tempers as Indicated *								
	Tempered 2 Hr at 1050° F	Tempered 2+2 Hr at 1050° F	1050° F 2 Hr	1050° F 2+2 Hr	1050° F 2+2+2 Hr	1075° F 1 Hr	1075° F 1+1 Hr	1075° F 1+1+1 Hr	1100° F 1 Hr	1100° F 1+1 Hr	1100° F 1+1+1 Hr
18-4-1 Type Quenched from 2350° F:											
4 hr at 450° F	64.7	64.5	64.5	64.2	63.9	....	....	....	....	....	....
8 hr at 450° F	64.5	64.4	....	....	....	64.0	64.0	63.9	....	....	....
12 hr at 450° F	64.4	64.1	....	....	....	....	....	....	63.8	63.5	62.6
4 hr at 500° F	64.8	64.5	64.6	64.4	64.0	....	....	....	....	....	....
8 hr at 500° F	64.5	64.2	....	....	....	64.0	63.9	63.4	....	....	....
12 hr at 500° F	64.4	64.1	....	....	....	....	....	....	63.8	63.3	62.8
4 hr at 550° F	64.5	64.5	64.3	64.0	63.8	....	....	....	....	....	....
8 hr at 550° F	64.0	64.1	....	....	....	64.1	64.0	63.7	....	....	....
12 hr at 550° F	64.0	64.1	....	....	....	....	....	....	63.7	63.1	62.7
4 hr at 600° F	64.6	64.6	64.4	64.3	63.9	....	....	....	....	....	....
8 hr at 600° F	64.5	64.7	....	....	....	64.4	64.1	63.7	....	....	....
12 hr at 600° F	64.5	64.8	....	....	....	....	....	....	64.1	63.7	63.1
Oil quench to room temp.	65.1	64.9	64.7	64.3	63.8	64.3	64.2	63.9	63.8	63.5	63.2
6½-5-4-2 Type Quenched from 2250° F:											
4 hr at 450° F	64.7	64.8	64.4	64.3	63.9	....	....	....	....	....	....
8 hr at 450° F	64.1	64.2	....	....	....	64.1	64.0	63.6	....	....	....
12 hr at 450° F	64.1	64.3	....	....	....	....	....	....	63.5	63.1	63.2
4 hr at 500° F	64.4	64.2	63.8	63.5	63.0	....	....	....	....	....	....
8 hr at 500° F	64.3	64.0	....	....	....	63.8	63.7	63.4	....	....	....
12 hr at 500° F	64.5	64.2	....	....	....	....	....	....	63.9	63.1	63.0
4 hr at 550° F	64.5	64.6	64.0	63.8	63.5	....	....	....	....	....	....
8 hr at 550° F	64.3	64.5	....	....	....	64.1	64.0	63.5	....	....	....
12 hr at 550° F	64.3	64.4	....	....	....	....	....	....	63.3	63.2	62.6
4 hr at 600° F	64.3	64.1	63.4	63.5	63.1	....	....	....	....	....	....
8 hr at 600° F	64.1	64.3	....	....	....	63.9	63.6	63.3	....	....	....
12 hr at 600° F	64.2	64.0	....	....	....	....	....	....	63.0	62.9	62.4
Oil quench to room temp.	65.1	64.7	64.6	64.0	63.6	64.2	64.0	63.6	63.6	63.2	63.0
18-4-1 +5 pct Co Type Quenched from 2350° F											
4 hr at 450° F	64.8	64.7	64.5	64.6	64.1	....	....	....	....	....	....
8 hr at 450° F	64.9	64.6	....	....	....	64.8	64.6	64.3	....	....	....
12 hr at 450° F	64.9	64.4	....	....	....	....	....	....	64.1	63.9	63.1
4 hr at 500° F	64.9	64.9	64.8	64.5	64.0	....	....	....	....	....	....
8 hr at 500° F	64.9	64.8	....	....	....	64.7	64.4	64.0	....	....	....
12 hr at 500° F	64.8	64.5	....	....	....	....	....	....	64.1	63.8	63.3
4 hr at 550° F	64.8	64.9	64.7	64.4	64.1	....	....	....	....	....	....
8 hr at 550° F	65.0	64.9	....	....	....	64.8	64.6	64.2	....	....	....
12 hr at 550° F	65.0	64.6	....	....	....	....	....	....	64.3	63.8	63.3
4 hr at 600° F	65.1	64.7	64.5	64.1	63.9	....	....	....	....	....	....
8 hr at 600° F	65.2	64.7	....	....	....	64.6	64.3	63.7	....	....	....
12 hr at 600° F	65.0	64.6	....	....	....	....	....	....	64.3	63.6	63.2
Oil quench to room temp.	65.0	64.9	64.7	64.4	64.2	64.5	64.6	64.2	64.0	63.6	63.5

* The same samples multiple tempered at the same tempering temperature. New samples multiple tempered at a different tempering temperature.

Mass Producing Hollow Metal Door Frames

USING straight line mass production methods, Diebold, Inc., Canton, Ohio, is currently producing some 800 to 900 prefabricated hollow metal door frames per day in its Hollow Metal Div. Designed primarily for the multiple dwelling market, these door frames are being built in five standard sizes as well as several special sizes. The majority of the frames are of the standard 30 and 36-in. widths.

Most of the door frames are designed for use with 2-in. plaster walls. After installation the frames themselves are filled with plaster, the design being such that the frames become permanently locked in the plaster. Door frames are provided with multiple punched holes and screws for hardware attachment, die cut holes for lock and reinforcements at locks and hinges.

Frames are designed to extend a short distance below the floor level and have floor clips welded to side jambs for securely fastening to the rough under-flooring. Material used in frames is 16 gage 1008 mild steel.

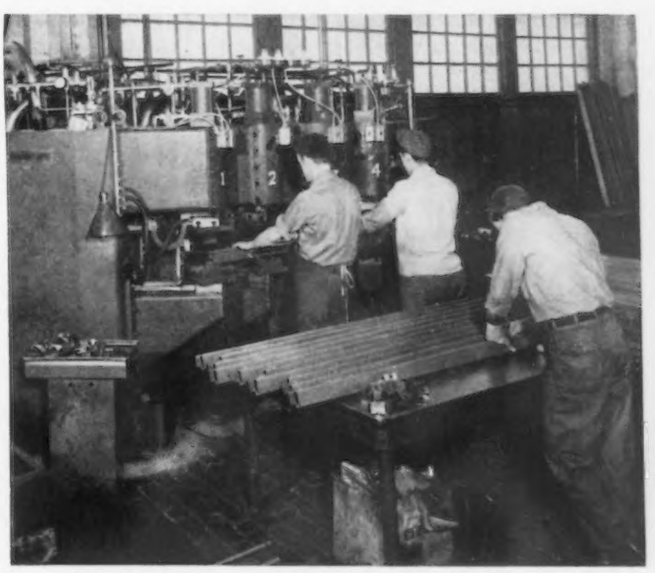
To produce these frames, jambs and top cross rails are first rough die cut and formed in press brakes at the beginning of the frame line, from sheared stock. Openings for lock and hinge reinforcements are next punched out on another press and a final forming operation brings the three main frame members to correct sectional shape.

Meanwhile double-thick hinge and lock reinforcement plates are produced by welding together two thicknesses of identical stampings with two spot welds each on a 50 kva Progressive Welder Co. spot welder. These are then welded into the main members on three 75 kva press welders.

To complete the sub-assemblies of side and top members, three spacer clips and one floor-mounting clip, fig. 1, are projection welded into the side members. For this an ingenious arrangement of four interlocked Progressive 50 kva welders is used as shown in fig. 2. The machines are so arranged that they actually become a multiple spot welding machine, all machines operating simultaneously from a single foot switch.

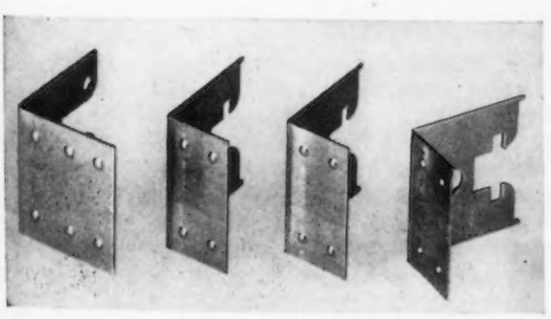
Two men, an operator and a helper, operate this unit. The clips are inserted in the rail and the assembly is laid on simple support fixtures on the machines. Pressing the foot switch starts the four interlocked GE timers to produce the various welds. Reason for the use of four timers is to provide maximum flexibility of welding sequence and timing of these machines. Thus brackets of four different thicknesses could, if desired, be welded into the rail at the same time by merely setting the timer on each machine for the specific thickness it is to weld. It should be noted that all welds on each bracket are preformed simultaneously with projection welding. Thus this machine actually makes 18 welds at one time.

The final fabricating operation on the door frames is to weld the side cross members together. This is done with the assemblies in fixtures on a turntable, using arc welding. Fabricated frames are then hung on overhead conveyers and carried through a vapor type cleaning, a prime coat paint dip, and a drying oven, ready for shipment.



ABOVE

FIG. 2—This arrangement of four Progressive 50 kva press type projection welders functions as a single unit from one foot switch. It is used to simultaneously weld the spacer clips and floor mounting clip into the door jambs with 18 welds.



LEFT

FIG. 1—The openings in these clips fill with plaster after the door frames are installed. They are assembled to each door jamb by projection welding.

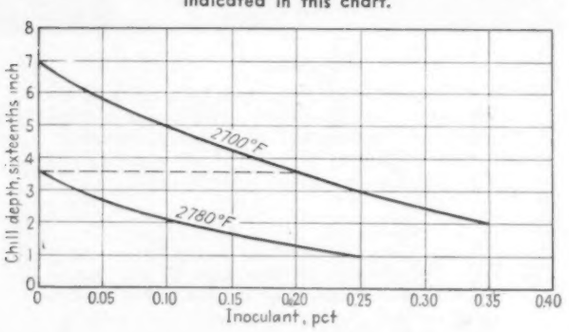
Practical Aspects of Gray Iro

Although much misunderstood, gray iron inoculation is basically a very simple process and holds many potential benefits for the average foundry. In this article the authors explain, from the practical foundryman's viewpoint, what inoculation is, how and where it can be most profitably applied, its effect, and types of inoculants available. They also cite several specific cases in which inoculation has proved to be of definite economic benefit.

INOCULATION, or the process of treating molten cast iron with a small amount of certain types of materials before pouring, is one of the simplest metallurgical processes in cast iron production, but is probably the most misunderstood by foundrymen. The production foundryman is vitally concerned with expense, and there may be a reluctance to consider any operation which will increase cost in any of its phases. Inoculation is, however, beneficial even in cases where the product is uniform and extreme control is exercised in all phases of the melting operation. It is considerably more beneficial where the resulting product is subject to the variations encountered without rigid control.

Inoculation is defined as the process of adding small amounts of certain materials to molten iron to produce changes in the physical properties of the metal which are not explainable on the basis of a change in chemistry. It is, by definition, a different metallurgical process from alloying. The purpose of alloying is to change the characteristics of the metal chemically to produce the desired results. It should be noted that some special purpose inoculants are available which contain enough alloy to produce an effect by chemical change as well as by the inoculation. These materials, however, have special application in cast iron metallurgy and must be used only where the special results are desired and can be obtained.

FIG. 1—Effect of cupola tapping temperature on the chill depth of gray cast iron with the same metallic change, and the effect of inoculant in reducing this chill death are indicated in this chart.



Inoculation procedure must, of necessity, be carried out at some point after the metal has been tapped from the melting unit. It is here that many foundrymen and cost analysts question the use of a material that seems to do nothing except to increase the cost of metal melted by an amount varying from a few cents to several dollars. Once the material is used it cannot be recovered, and if the same metal is remelted, an inoculant is again used. It has been proven in many foundries, however, that this expenditure is an investment that, if properly handled throughout, can pay substantial dividends in many ways.

The production foundryman is normally concerned with the metal in a casting only insofar as three properties related to the metal are concerned. These three properties are (1) machinability of the casting, (2) strength and hardness properties required by the metal specification, and (3) freedom from gas holes or porosity in the casting which originates in the metal. The casting is usually deemed to be satisfactory from a metal standpoint if these three properties are obtained. The judicious use of an inoculant along with a satisfactory melting technique can result in a better control of these properties than can be obtained by a control of only the melting operation. This is especially true in a jobbing shop where a large variety of castings is produced, but it applies also to the production shop with its few standard items.

All foundrymen have problems relating to the production of metal for castings of various section sizes and have occasional melting irregularities, which will affect the properties of the metal taken from the melting unit. An inoculation practice permits considerable flexibility in the production of metal for specific castings and provides a way to correct melting irregularities that may otherwise result in unsatisfactory castings. Both of these points have definite economic advantages that can only be evaluated for specific cases but which frequently more than pay for the additional cost of inoculated iron.

An inoculation procedure provides a way to supply "tailored" iron suitable for the specific casting in which it is to be used. Inoculation, although it cannot result in the production of one base iron for the whole range of section sizes

Iron Inoculation

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and
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INOCULANTS can be added in several ways, depending upon the type of inoculant used. This illustration shows an inoculant being added by hand to the runner.

which it is possible to encounter, can definitely broaden the effective range of sections which can use one base iron. This results in a decrease in the number of separate charge mixtures which would otherwise be required to encompass the range involved in any particular foundry, thereby resulting in greater flexibility of the operation in the foundry. Product quality can also be improved because more uniform properties can be obtained in castings with light and heavy sections.

Inoculation can also correct certain phases of the normal melting irregularities. If melting irregularities are to be considered, we can investigate the effect of inoculation in improving the quality of iron produced when the melting temperature of the iron is lowered. It is well known among foundrymen that the lower the tapping temperature of the iron the harder that iron will be. This is demonstrated in fig. 1, where the chill depth of an iron at 2780°F (tapping temperature; this is assumed to be related to melting temperature, other conditions being equal) is seen to be considerably lower than the chill depth at 2700°F. Inoculation, however, will result in a lowering of the chill depth of both irons (see fig. 3), and the inoculated 2700°F iron can be used in castings which, if cast with uninoculated iron, would require a melting temperature of 2780°F. The beneficial effect of a small percentage of inoculant on the chill depth of gray iron is illustrated in fig. 2.

Inoculation will also have a beneficial effect on the tensile strength of gray cast iron. It is of prime importance that correct metallic charges be used to obtain the required tensile strength. If, however, the specification desired for a particular casting is at the upper limit of the tensile strength range of the regular charge, it may be possible, by proper inoculation, to insure that the requirements of this specification will be fulfilled in nearly all cases without a charge change. This characteristic is demonstrated in fig. 3 where the improvement in tensile strength for a cast iron with a carbon equivalent (TC plus 1/3 Si) of 3.85 pct reaches maximum of 3000 psi at a 0.15 pct ferrosilicon addition. It can readily be appreciated that this effect may have definite economic advantages and may help to offset the increased cost of the inoculated iron.

Among the more difficult defects to evaluate properly in gray iron castings are porosity and gas holes. It is common for the molding department to attribute all cases of unsoundness to the metal department and vice versa. It is probably true that either department may be responsible for this condition when specific cases are analyzed. If cases of unsoundness, which can be directly traced to metal, are analyzed, it may be found that a proper melting and inoculating technique can bring about a reduction in this type of defect. Most foundrymen have noted that this type of defect occurs more commonly with the soft or high carbon and high silicon irons. Although further investigation is required on this subject, there is a strong indication that the production of a somewhat harder base iron accompanied by the proper inoculating technique to maintain machinability will result in a substantial decrease in such defectives.

It has been found that the most satisfactory and economical results are obtained when the inoculant is used in conjunction with a routine chill depth test. The use of the chill depth test will result in the most economical use of the

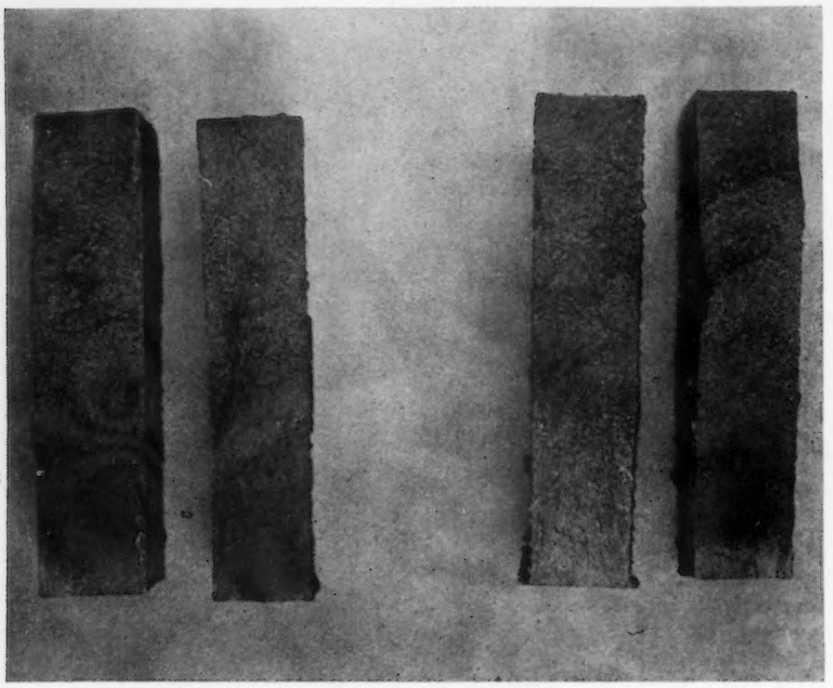


FIG. 2—These two sets of chill blocks illustrate the potent chill reducing effect of an inoculant. The set to the left shows the chill reduction obtained by the addition of 0.10 pct inoculant to a base iron of 4.10 CE. The set to the right shows the chill reduction obtained by adding 0.20 pct inoculant to a base iron with 3.80 CE. The chill block on the left in each set is uninoculated, while the block on the right is inoculated.

inoculant and will also provide a control over the machinability factor mentioned previously. It has been possible to correlate depth of chill and machinability with such success at this Westinghouse foundry that maximum allowable chill depths can be specified with specific castings; thereby the customer is provided with machinable castings that still meet tensile strength specifications.

The use of the routine chill depth test is not essential, but it is recommended. If it is not feasible to establish such a test procedure with a metal tester, the melter, or the cupola tender, it is still desirable to establish an average ladle addition, which can be made regularly. This addition should be checked periodically to insure that the most efficient use is being made of it.

Inoculants should be added to the metal in such a manner that maximum solubility will be effected with a minimum loss of the inoculant. The most satisfactory method of adding the inoculant depends on the type of inoculant and the particular handling problems encountered in the foundry. The specific gravity of the inoculant may determine whether it should be added slowly to the metal in the runner from the melting unit or whether it should be added in a mass to the churn of the metal as it falls into the ladle. It is possible to have either a mechanical setup with a calibrated feeding device in which the inoculant is never touched except to refill the supply bin, or the predetermined amount of inoculant may be added by hand to the runner. It is also possible to have the ladleman add a small bag containing a predetermined amount of inoculant to each ladle of iron drawn from the melting unit.

There are a large number of so-called inoculants on the market today. They may vary from an element such as graphite (carbon) to chemical compounds made up of two or more elements. Practically all of the compound types of inoculants contain silicon as one of the elements present. The tabulation in table I indicates some of the proven inoculants and lists the more important chemical elements contained in them.

Each type of inoculant has its proponents and many claims are usually made for its efficiency. The most satisfactory procedure in selecting an inoculant is to try several kinds and select the one that does the most satisfactory job with the lowest cost per ton of iron produced. As a general rule, it has been found that the best inoculants are those which are strong deoxidizers. This fact lends emphasis to the belief that inoculation is in effect a deoxidation phenomenon.

The particle size of the inoculant will determine, to a great extent, the efficiency and therefore the economy of the process. The material must contain neither particles so large that they will not be readily absorbed by the molten iron, nor so small that incipient fusion of the material will occur and produce a somewhat frothy mass that will merely float on the metal. The method of adding the inoculant will normally determine the desirable size of the material. A fairly coarse material (½ in. max, 12 mesh min) is normally found satisfactory where the inoculant is added to the metal in the runner from the melting unit. A much finer material can be used where the inoculant is added in bags to the transfer ladles during the filling of the ladle. The solution to this problem must be dictated by

TABLE I

Typical Inoculants

Name	Elements Present
Element type:	
Graphite	Carbon
Compound type:	
Ferrosilicon	Iron, silicon
*Ferrocarbo (powdered)	Silicon, carbon
*SMZ	Silicon, manganese, zirconium
*Graphidox	Calcium, silicon, titanium
Alloy type:	
*CSMZ	Chromium, silicon, manganese, zirconium
*V-alloys	Chromium, silicon
*F-Nickel-B	Iron, nickel, silicon

*Trade name of proprietary material.

local conditions but should, nevertheless, receive considerable attention.

The principal disadvantage encountered in the use of an inoculating procedure is the production of slag in the metal after the inoculant is added. This slag may result from the deoxidation of the metal forming oxides of various types which rise through the body of the metal and collect on the surface. This slag can easily be skimmed off, however, and offers no more trouble than the slag produced in the melting unit.

The flexibility of the inoculation procedure can be well demonstrated by a few examples of casting production at the Westinghouse foundry at Trafford, Pa. Approximately 70 pct of the metal required for this operation is ASTM class 20 with the remaining 30 pct being ASTM classes 30 and 40. All tests are made on 1.2 in. arbitration bars. The ASTM class 20 gray iron must be available at all times as demanded by the molding units. The higher strength iron is produced during a portion of the day as necessitated by production requirements, this operation being scheduled insofar as possible.

The ASTM class 20 gray iron is used for metal sections from 1/16 in. to approximately 1½ in. in thickness. The thin sectioned castings must be freely machinable in automatic machines and the heavy sectioned castings must not show undue porosity or openness. A base iron is melted which, when inoculated with approximately 0.10 pct of SMZ (or similar inoculant) will produce satisfactory metal for sections down to 3/16 or ¼ in. Metal which is supplied for the thinner sectioned castings is given an additional treatment of 0.30 pct SMZ (or similar inoculant) in order to eliminate the chill and provide satisfactory machinability in these castings. Inoculation here demonstrates its flexibility in providing satisfactory metal for a rather broad range of sections which must be covered by one base metal.

Similar problems are encountered in the ASTM class 30 and 40 metal requirements with the additional problem of providing adequate strength in certain castings to resist applied loads in testing. The most critical casting types involved in these metal classes are the so-called explosion-proof castings for electrical equipment. This equipment is produced under rigid Underwriters Laboratory control and the castings must meet critical pressure tests before being accepted. It is absolutely essential that metal of the proper specification be used; for the majority of the castings, ASTM class 40 gray iron is required to resist the pressure test. These castings have a normal metal thickness of ⅝ in. and must be machinable without undue difficulty. The normal

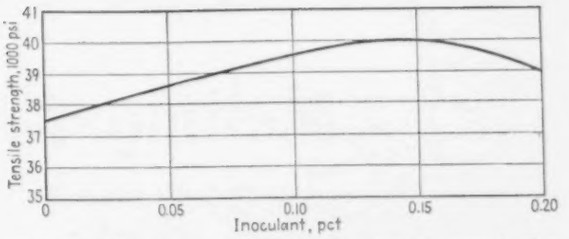


FIG. 3—Effect of an inoculant on the tensile strength of a gray iron with a carbon equivalent of 3.85, and a tap temperature of 2700°F.

base iron for the ASTM classes 30 and 40 castings is produced to provide a dense structure in castings with metal sections of 4 to 6 in. in thickness. This metal is treated with varying amounts of inoculant, as determined by the chill test, to provide a casting with satisfactory machining characteristics coupled with the strength required to resist the applied pressure test.

A number of the castings produced at Trafford foundry have certain metal sections of 7 to 9 in. in thickness coupled with other sections of 1¼ to 1½ in. in thickness. Blade ring sections in turbine covers or bases are typical examples of such castings. Special charges are melted in the cupola to provide satisfactory iron for the heavy section. Proper inoculation provides a more uniform structure throughout the heavy and light sections, promoting satisfactory machining characteristics in the light sections and insuring satisfactory soundness in the heavy sections.

The inoculation treatment correlated with a satisfactory chill test routine provides the utmost flexibility in the operation of a semijobbing foundry such as the Trafford plant.

In view of the benefits obtainable by the proper use of inoculation, the economic and operating disadvantages relating to its use are minor. Metal cost at the spout will be increased, but a very small reduction in the number of machine shop rejections due to machinability will more than pay for this cost without counting the gain of increased customer goodwill. If the inoculation process is adjusted to reduce casting porosity, a direct and tangible gain will be made through the reduction of foundry and machine shop rejections and will reflect itself in more favorable operating costs. The improvement in tensile strength of the iron may not always result in a tangible gain for the foundry, but the increased confidence of the user of gray iron castings in the engineering properties of this material will certainly benefit the industry. It has been proven in many foundries that the inoculation process is an economically justifiable expenditure.

High Speed Camera Permits Action Studies

USE of high-speed motion pictures to study swift, blurred, or transient action is illustrated in a 16mm silent film now available from Eastman Kodak Co., Rochester, N. Y. Entitled "Time Magnification," the film slows down sequences taken with the Type III Eastman high-speed camera at speeds ranging from 1000 to 3000 frames per sec, projecting these sequences at a normal speed of 16 frames per sec. This is said to slow down the action photographed by factors as great as 187 times. The sequences are in both black and white and color. A riveting machine, high-speed cutting tools in operation, and an electric welding arc are also shown.

Melting Aluminum Scrap in the L

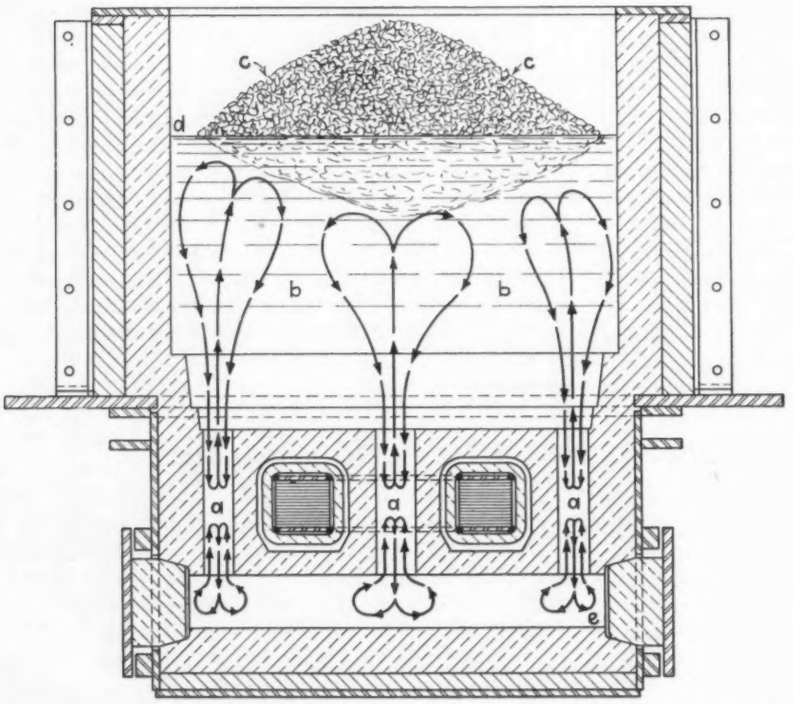
By MANUEL TAMA
Vice-President, Ajax Engineering Corp., Trenton, N. J.

THE melting of small metal particles, such as chips, borings, turnings, sawings, scalpings, sweepings, grindings, swarf, powder, foil, etc., presents many interesting engineering aspects. All metals are subject to more or less severe oxidation, the rate of which is increased at higher temperatures. Aluminum and aluminum alloys, to which this discussion refers in particular, have a very pronounced tendency to form oxides. Anyone who has observed molten aluminum flowing out of a nozzle or pouring spout will recall how a thin oxide hose is formed instantly around the emerging metal stream and how it solidifies after the stream ceases to flow.

Particles of aluminum or aluminum alloys which have been subjected to higher temperatures either in melting or annealing operations are covered with an oxide coating. The metal oxides usually have a lower heat conductivity than the metal from which they are derived. The heat conductivity of pure aluminum is 1.01 and that of powdered aluminum oxide is 0.00162, both expressed in terms of gram calories per centimeter per degree Centigrade and per second at the melting temperature of aluminum. As these figures show, the conductivity of aluminum oxide is 620 times lower than that of aluminum metal. A layer of aluminum oxide 0.001 in. thick has, therefore, the same insulating qualities as a layer of aluminum 5/8 in. thick. Obviously, the insulating effect of such an oxide coating is more pronounced if the coated particles are small.

The increased thermal resistance of oxide coated particles is the chief reason why they are difficult to melt in furnaces operated on the principle of heat transfer by radiation and convection. A very plausible explanation of the different steps involved in melting aluminum scrap in reverberatory furnaces was given in 1928 by Stay, Hobbs, and Burrows. According to their theory, all aluminum is coated with a layer of oxide, possibly mixed with nitride or carbide. When such material is charged into a furnace, without the aid of a liquid heel, melting starts within the solid material until fluid metal breaks through the oxide film and forms globules. Each globule is coated immediately with a new film of oxide and drops to the bottom of the container. The oxide casings are broken by the fall and coalescence takes place. This process goes on slowly and repeatedly. New oxide films are formed persistently around the globules and the result is an excessive additional formation of oxide with incumbent high melting losses.

FIG. 1—Diagram showing mechanism of heat transfer in a twin-coil low frequency induction furnace; (a) melting channels where heat is generated; (b) liquid pole which serves as a heat carrier to the cold charge (c).



In a submerged resistor induction melting furnace the conditions are different in many respects. For the purpose of explaining the mechanism of heat transmission within such a furnace, three different zones should

Low Frequency Induction Furnace

Obtaining high recovery rates when melting aluminum scrap in the form of chips, borings, grindings, foil, etc., presents a number of problems. This article discusses the phenomena of low frequency induction melting and explains how these characteristics tend to produce high recovery rates. The article also describes a technique developed at Scovill Mfg. Co. which resulted in an average recovery rate of 96 pct. A discussion of the characteristics of oxide coated particles and their effect on heat transfer in the furnace is also presented.

be considered, as follows: (a) the melting channels, (b) the heel of molten metal, and (c) the cold charge. Each zone is marked with the letters *a*, *b*, and *c*, respectively, in fig. 1.

The heat is generated exclusively in the melting channels, zone *a*, which usually represent only a small fraction of the total holding capacity of the furnace, somewhere between 10 and 20 pct. A large amount of energy is here concentrated in a small space, and it is important to make proper arrangements for a quick and efficient transfer of the heat energy from zone *a* to *b*. The melting channels must be properly dimensioned with respect to the current densities utilized. Due to electromagnetic forces, a movement of the melt is created, as indicated by the arrows in fig. 1, which illustrates what may be called the classical theory of metal movement in submerged resistor induction furnaces.

Carl Hering was the first to describe and utilize this theory early in 1912, and it has been confirmed many times thereafter by several investigators and inventors. In a melting channel, carrying a large current, at the point of transition from a small cross-section to a large cross-section, an outward and an inward movement of the metal comes into effect. A series of eddies is formed along the path of the electric current. The agitation thus achieved is so violent that the heat is quickly dissipated from the melting channels, as can be readily demonstrated by recording the temperature at the hearth *d* and at the bottom *e* of the heating channels. The temperature difference between these two points is surprisingly small.

A further step is the transfer of heat from zone *b* to zone *c*, i.e., from the molten heel to the charge of solid metal. The rate of heat transfer depends, in the first place, on the speed of movement between the molten heel and the cold metal. It is also influenced by the heat conductivity of the metal charged into the furnace. If the heat conductivity of the metal, as charged, is too low, the rate of heat penetration from the liquid heel to the cold metal may not keep pace with the rate at which heat is dissipated from the melting channels. When that happens, overheating of the heel will result.

In a submerged resistor induction furnace the fine particles are not subjected to a high temperature from above; hence, the rate of oxidation before melting is reduced considerably. As a consequence of the bath movement, speed of melting is increased and the oxide skin is detached from the metal and expelled to the surface. Fig. 1 shows how a charge of chips is melted in the hearth of a twin-coil low frequency induction furnace. The bulk of the charge is dumped into a heel of molten metal. As long as the electric current flows through the melting channels a very violent agitation occurs at the surface of the liquid metal where contact is made with the lower layers of fine particles. The arrows indicate the movement of the liquid metal emerging from the melting channels. The result is that the chips are immediately and quickly surrounded with molten metal without time for oxidation.

A small amount of oil or lubricant left on the chips is beneficial in preventing air from reaching the lower layers of the charge where oxidation could occur. The lubricant burns as soon as the ignition temperature is reached, and combustion of the lubricant ties up all the air contained in the charge, and, therefore, there is no possibility of further oxidation. A very smooth melting without mechanical poling or stirring is achieved. The chips fall automatically into the hearth at the rate at which they are melted, and it is only necessary to continue to fill new chips to the top of the furnace.

An interesting case history is that of the Scovill Mfg. Co., Waterbury, Conn., who during the war produced large quantities of 17-S forgings. In the machining operation of these forging a large amount of chips was produced. With the background of 25 years of experience in induction melting, the Scovill company installed a 60-kw, low frequency Ajax furnace, shown in

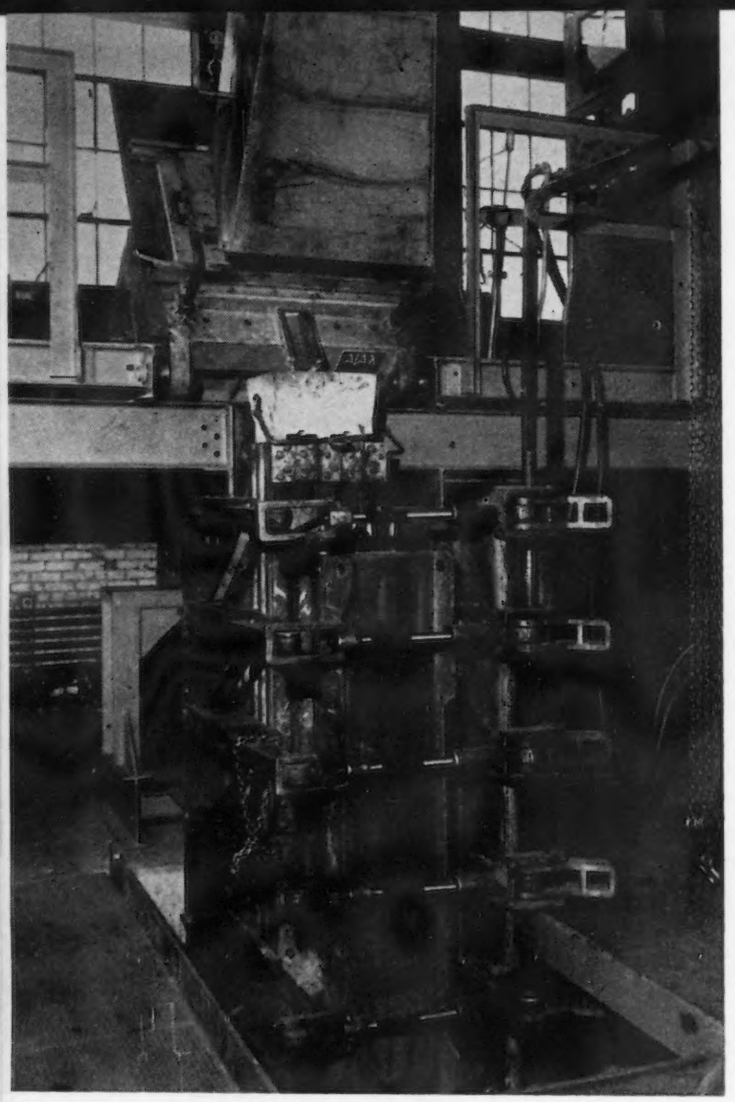


FIG. 2—A 60-kw Ajax, twin-coil, single-phase induction furnace (top background) used during the war at the Scovill Mfg. Co. for reclaiming 17-S chips.

fig. 2, and achieved a very satisfactory recovery of the chips. To facilitate charging, the top of the furnace was mounted on the same level as the charging platform.

Prior to melting, the chips were centrifuged and dried in superheated steam, thus reducing the lubricant content to about 2 to 4 pct. They were then transferred in steel containers to the melting room and dumped into the furnace. A well-ventilated hood placed above the furnace carried all the combustion gases, dust, and smoke away from the foundry. After the metal was completely liquified, without requiring mechanical stirring, the temperature was raised to about 1500°F. The melt was quickly fluxed with a small amount of aluminum chloride immerged in an aluminum foil envelope. Thereafter it was poured into the molds, thus obtaining a cast round bar 2½ in. in diam which could be used again immediately for forgings, and which gave all the physical and mechanical characteristics of those originally made from extruded stock.

The most remarkable part of this performance is that the mold used for casting the rods was of the traditional type used in the brass industry, a composite cast iron book-mold with a launder at the top—no tilting mold, no bottom pouring—just the usual brass bar mold with a good lubrication. The casting time was about 1½ min.

The Scovill Co. recovered an average of 6000 to 7000 lb of chips in 24 hr. The average rate of recovery, based on the dry weight of the charge, was 96 pct.

When the first tests were made to melt aluminum foil in an induction furnace, the surprising fact was discovered that loose foil could be melted quicker and better than baled foil. Loose foil disappeared rapidly from the surface of the bath immediately after it was charged, and it was only necessary to feed the furnace quickly enough to keep pace with the melting rate. When baled foil was charged, melting was sluggish, a condition which can be explained with the high insulating properties of superimposed layers of aluminum foil. A compressed brick of foil is a body of large resistance to heat flow in the transversed direction. When such a brick was submerged into the test furnace, which was provided with an automatic temperature control, the control repeatedly cut off the power, before the brick was molten. This was an indication that the liquid heel was overheating, because the heat could not be transferred rapidly enough to the inside of the cabbaged foil.

In the commercial application of induction furnaces in foil mills it is recommended that foil scrap be removed from rolling mills or slitting machines by a suction system or by other suitable means and conveyed directly to the melting furnace. A prominent foil mill reports that ingots produced in the induction furnace entirely from mill scrap could be rolled down to foil, following the same procedure as applied to ingots produced from virgin metal.

The 60-kw twin-coil, single phase furnace operated by Scovill was different from previous induction furnaces insofar as a high current density was concentrated in the central melting channel. This high amperage, combined with a symmetrical magnetic field and with the low specific gravity of aluminum, produced a fountain of molten metal above the center channel of an intensity which had never been observed before.

The fountain-like agitation of the bath was recognized as the deciding factor in obtaining quick melting of finely-divided aluminum alloy scrap with low losses at the time of the Scovill performance. Mechanical devices to stir the metal bath have been widely used heretofore, also in connection with induction furnaces, but the electromagnetic stirring is more effective and easier to control. It can be intensified or diminished at will, according to the requirements of the melting procedure to which the furnace has to be adapted. Also, the possibility of melting at extremely low temperatures has been recognized as an important feature, typical of the induction furnace. The Scovill furnace was operated with an automatic temperature control, to obtain low temperature in melting.

In the past, induction furnaces have in many cases contributed to reduce melting losses in the metalworking industry. The most spectacular example is that of the Ajax-Wyatt furnace, which emerged after the first world war and changed overnight the economy of the brass industry.

due to reduced zinc volatilization. A prediction made by J. W. Richards in 1919 that "it will be but a short time before all the brass in this country will be melted in electric furnaces," has been fully realized not only in this country but in the whole world. In the aluminum industry, in particular, in the field of scrap recovery, a similar development is under way.

In Germany, many induction furnaces for melting aluminum alloys were installed and operated during the last war, but strangely, none was used for scrap recovery and no automatic temperature controllers were installed. In this country, the aluminum fabricators have recognized the importance of the induction furnace for remelting scrap in the form of small particles.

[1] *Losses in Aluminum and Aluminum Alloy Melting, U. S. Bureau of Mines Serial No. 229, 1921.*

The U S Bureau of Mines published a report[1] in 1921 in which it is stated that the average recovery from light alloy borings and related scrap is estimated to be between 65 and 70 pct of the charge. Today large manufacturers report recovery rates ranging from 80 to 90 pct in the reverberatory furnaces.

From data obtained at different places where low frequency induction furnaces are used for melting small size scrap, it can be safely stated that the recovery can be stepped up under similar conditions to range from 92 to 96 pct.

Acknowledgment

The author acknowledges his gratitude to the Scovill Mfg. Co. for permission to publish the results of their work on the recovery of aluminum alloy scrap in induction furnaces.

Centerless Grinder Work Blade Life Lengthened

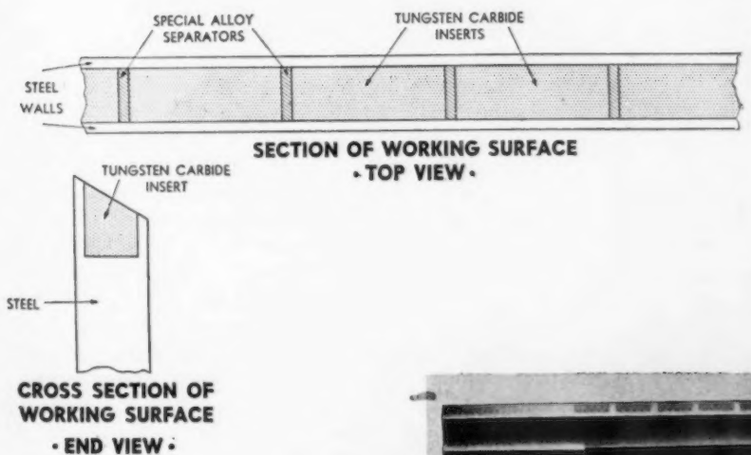
SUBSTANTIAL reductions in blade costs in centerless grinding operation is said to be possible through use of a recently announced work rest blade. This blade, known as the Clifco blade, features a wearing surface of alternate sectional inserts of tungsten carbide separated by thin strips of alloy steel, laid in a slot with supporting walls of steel, as illustrated in figs. 1 and 2.

The construction of this new blade, developed by Cliff Co., Chicago, is said to permit its use on practically all types of centerless grinding and on all types of metal.

The supporting alloy and steel walls are said to prevent chipping of the carbide and permit use of a harder grade of carbide than normally used. The Clifco blade is fitted with CA-4 Cormet inserts, and may be resurfaced. Another feature of the Clifco blades is that the carbide inserts may be individually replaced at a low cost.

The new blade has been undergoing field runs for some time with the following typical results: On rough grinding piston pins 1-in. diam. and under, at Burgess Norton Mfg. Co., Geneva, Ill., the blade ran 520 hr before resurfacing was required. On a job involving rough plunge grinding of tappets at the Chicago Screw Co., 173,000 units were handled before resurfacing. In grinding drills at Republic Drill & Tool Co., Chicago, the blade ran 16 hr a day for as long as 7 months on finishing work before resurfacing.

On the piston pin grinding job cited previously, the cost of the Clifco blade was 9¢ per work-hr, as compared with 62½¢ per work-hr with tool steel blades.



LEFT

FIG. 2—Sketch shows construction of the Clifco work blade. Use of supporting alloy separators and the steel walls is said to prevent chipping of the carbide inserts.

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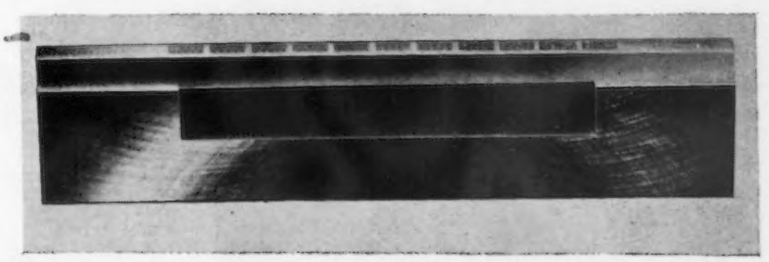
BELOW

FIG. 1—The Clifco work rest blade, viewed from above and front. The tungsten carbide and alloy steel inserts can be seen on the working surface.



Auto Brake Disks Produced With Progressive Dies

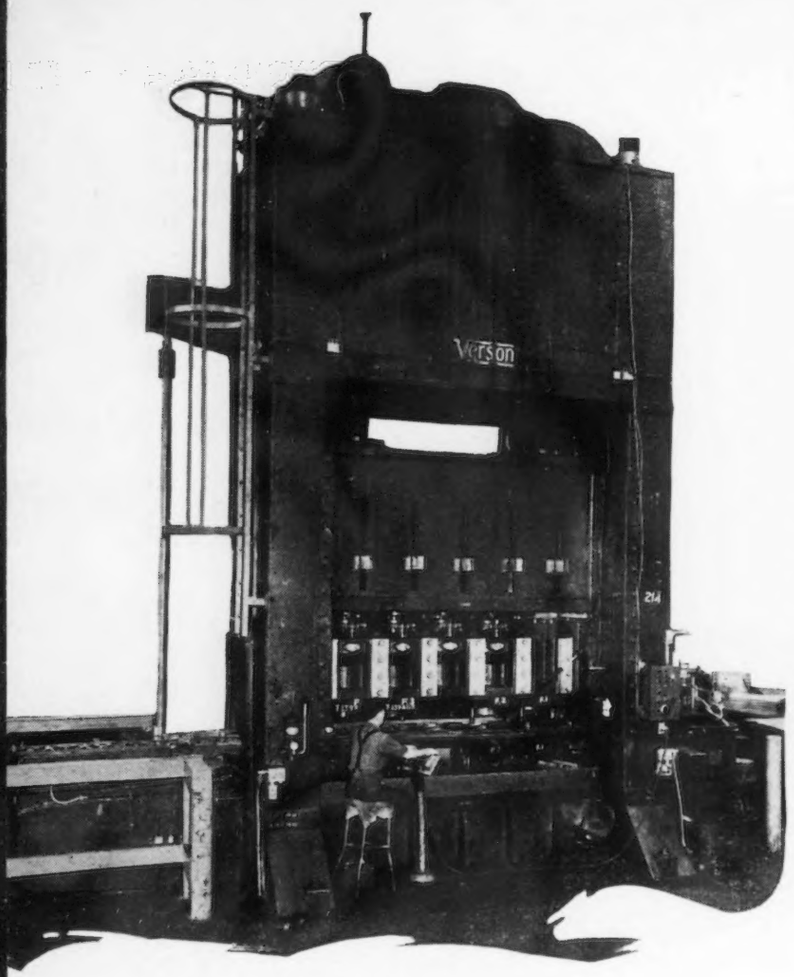


FIG. 1—Verson press setup in Buick's new sheet metal shop for producing brake drum disks. The bed is equipped with an automatic transfer feed for successive operations on the disks.

Stamping of Buick brake disks in a transfer setup employing four dies in a single press is described in this article. This new setup, replacing single dies in four individual presses, has reduced handling and increased production. The author also describes the operation of a simple stacking device which greatly facilitates the handling of circular blanks from a press.

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By HERBERT CHASE

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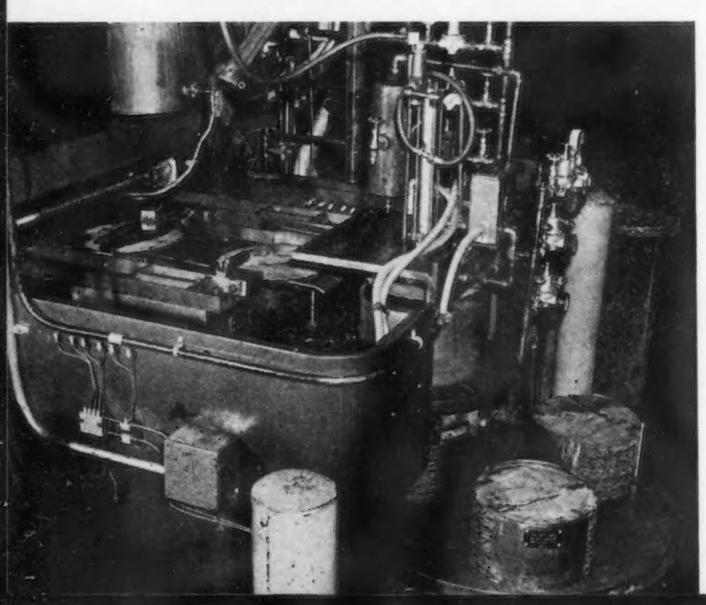
UNTIL recently, the steel disks that support the cast iron brake drums of Buick cars were produced in successive operations in dies set up in four individual presses. Now the job is done much more rapidly and with less handling by a transfer setup employing four dies in a single Verson press using blanks produced in another press which cuts three blanks per stroke.

FIG. 2—Blanks are fed to the press one at a time by an automatic suction device from holders on the dial at lower right. Subsequent shifts are effected by transfer bars that operate gripper fingers.



Stock used is hot-rolled steel strip 0.105 in. thick and 37¾ in. wide which is run through straightening rolls as it is fed to the press. If strip 14 in. wide were used, blanking could be done, one piece at a time, in the same Verson press used for subsequent operations, but by blanking from wider strip and staggering the blanks there is a substantial saving since more blanks per ton of steel are secured.

The blanking press cuts up the flash as blanking is done, hence there is no need to provide a winding roll for this flash as it merely falls into a tote box for scrap. Blanks are stacked in uniform fashion to facilitate loading into holders on the magazine dial of the Verson press. In blanking, the edge is serrated to provide teeth that lock the stamping in the iron brake drum when it is cast in a centrifugal mold.

Fig. 1 shows the progressive stamping setup at the new Buick Flint press shop which converts the blanks into disks and feeds them down a chute (at extreme left) into a tote box. Feeding is done automatically from the opposite end of the bed, as shown in fig. 2. Blanks, placed horizontally in three holders on a dial, are lifted one at a time by suction and are deposited on a short table at transfer bar height.

Transfer bars are first brought together by an actuating mechanism so that fingers grip the

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FIG. 3—Close-up of the press bed showing the four dies that perform the successive operations on the disk. No die is used at the central station which is left blank in this setup.

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blank which is then advanced by longitudinal motion of the bars. The fingers then drop the blank into the first die. There, as the die closes, the first forming operation is done and a central hole and one eccentric hole, both for locating purposes, are pierced. This first forming gives the blank a dished shape including a 1-in. flange.

Transfer bar fingers then close and shift the piece to the second die where positioning is done by the holes that fit over locating pins having conical ends. In this die, the edge is formed so that teeth left by prior serrating are turned at right angles to the face. This forming gives the disk its final 12½-in. diam.

After shifting to the next die an oblong hole is pierced in the flange but the slug produced, instead of being pushed out, is left in the hole. In the final die, this slug is pushed back flush with the flange and is left for subsequent hand knockout, for inspection purposes, after assembly. At the same time, six bolt holes are pierced and the central hole is enlarged to finish the press operations on this piece.

As shown in fig. 3, only four dies are used in the press, the central space being left blank. Once the dies are filled, however, the press delivers a finished piece for each working stroke. Slugs feed down through the dies and into scrap boxes for disposal. All punches are arranged for convenient screw adjustment through gears provided for this purpose.

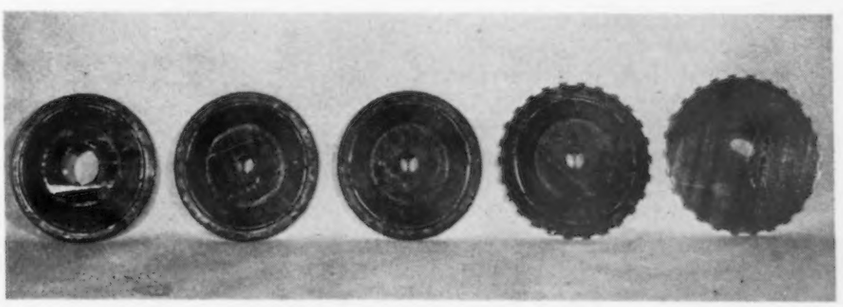
By using separate dies rather than a single progressive die, any unit can be removed for repairs, if required, without disturbing remaining units. Setup is also simplified. The operator remains seated while the press is running and it stops only when he removes a hand from either of the control buttons. Fig. 4 shows the successive stages from a blank to a completely

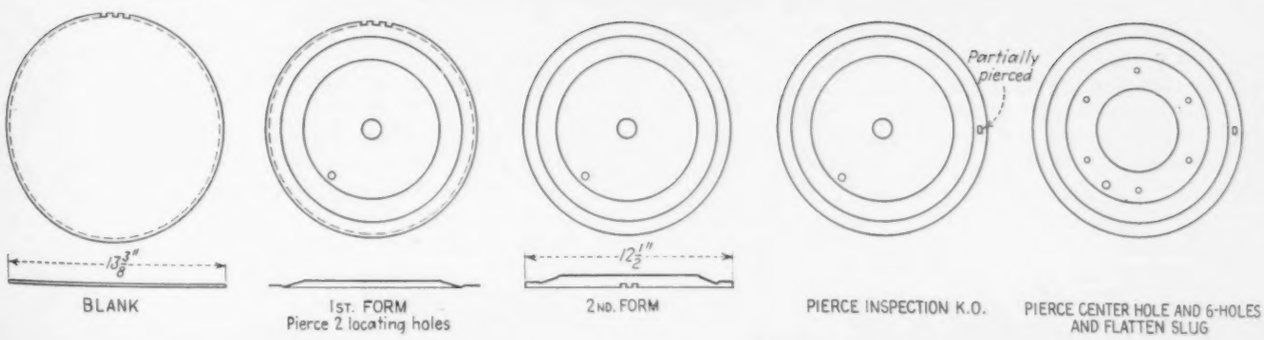
RIGHT

FIG. 4—Successive steps in the production of Buick brake drum disks from blank (extreme right) to finished formed and pierced piece at extreme left.

BELOW

FIG. 5—Drawings showing side and plan views of the brake drum disk in successive stages of manufacture, starting with a serrated blank 0.105 in. thick and 13⅜ in. in diam. In the next to last operation, a slug is partially pierced out and pressed back into the hole in the next operation. It is knocked out later for inspection purposes after assembly.





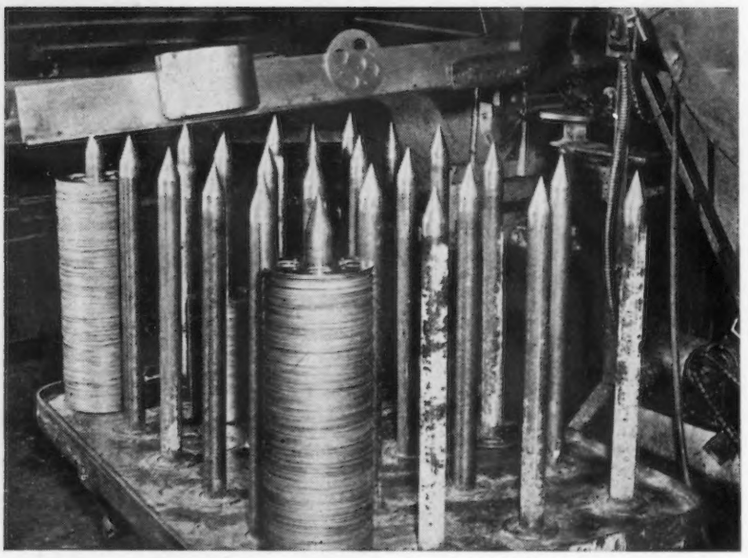


FIG. 6—Close-up of an automatic disk stacking device. Disks drop from an elevating belt into a trough, roll down a track and are deflected to a horizontal position so as to fall over one of the pointed pins on a pallet.

formed piece. Fig. 5 gives the side and plan views at each stage.

Among other circular parts used in Buick cars are the disks for the engine torsional vibration damper. These are merely blanked in large numbers from stock trimmed from large sheets used for making hoods and fenders in the same plant. The disks are of about 8-in. diam and, after blanking, fall onto a cleated belt conveyer. Formerly, this conveyer dropped the blanks into a tote box and considerable hand work was later required to stack the parts uniformly.

To avoid this, the special stacking device shown in fig. 6 has been put into effective use. The same elevator belt is used but, instead of dropping each blank into a tote box, the blanks fall into a trough and roll down a track as shown. When a disk strikes a shield on the track, it is deflected into a horizontal position and falls so that its center hole is over the conical end of a stacking pin which is a loose fit in the hole. Thus, the disks are stacked automatically.

Twenty-four of these pins are fastened on a pallet made for the purpose, and when one pin is filled, the shield is shifted by the press operator to deposit the disks over another pin. The track is pivoted and by swinging it and adjusting the shield (held by a thumb screw) all pins on the pallet can be filled without shifting the pallet. When filled, the pallet is shifted by a fork truck and is transferred to a department where the disks are removed in good order and with a minimum of labor.

. . . NEW BOOKS . . .

"Organization and Management in Industry and Business," by William B. Cornell. The third edition of this book stresses up-to-date practices of progressive companies with new developments which business executives have introduced into organizations included to indicate today's basic trends toward improved management methods. New approaches to major problems have been highlighted to show their practical effects on industrial and business operation. Ronald Press Co., 15 E. 26th St., New York 10. 891 p. $5.00.

* * *

"Hardenability of Alloy Steels." Published jointly by SAE and AISI, this book covers current data on designing, testing and ordering steels by hardenability-band specifications and includes 62 tentative hardenability-band steels, 25 of which appear for the first time. Other sections discuss selection of automotive steels on the basis of hardenability and the SAE method of determining hardenability. Six tables on conversion of steel hardness numbers are given. Society of Automotive Engineers, Inc., 29 W. 39th St., New York 18. $2.00. Members $1.00.

"The Management Leader's Manual," by James O. Rice and M. J. Dooher. The purpose of this manual is to bring to operating executives, supervisors and foremen, some of the best available information on human relations and operating problems. Contained in this handbook are hundreds of studies bearing on how to improve relations with groups and individuals. American Management Assn., 330 W. 42nd St., New York 18. 190 p. $3.00.

* * *

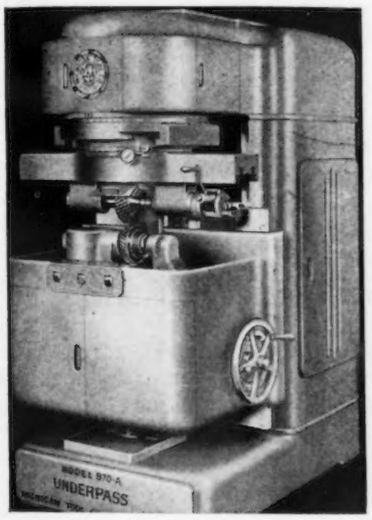
Chemical Analysis — Automatic infra-red gas analyzers that can detect concentrations of carbon monoxide, carbon dioxide, or hydrocyanic acid as low as one part in one hundred thousand were invented in Germany, according to this report. These instruments can discover the presence of a simple chemical compound in a gaseous mixture and measure its concentration by irradiating the mixture with infra-red light of a wave-length that only the compound can absorb, the report states. The resultant thermal expansion of the mixture is an identification of the compound; and the amount of expansion, a measure of its concentration. *PB-48678; photostat $15.00; microfilm $5.00; 215 p.*

New Equipment . . .

Gear finishers, a hydraulic press, a precision shaper, automatic screw machines, a fine pitch gear generator and a polishing lathe head the list of new equipment described this week. Also included is a two-ton hydraulic vise, a hydraulic power unit, tap grinder, vibration loading device, induction motor, camshaft drive and other new products.

Gear Finishers

A NEW line of high production crossed-axis rotary gear finishers, consisting of two models in three sizes each, is being announced by *Michigan Tool Co.*, 7171 E. McNichols Rd., Detroit 12. Model 870-A Underpass permits selection at will of any one of three different methods of gear finishing: underpass shaving, in which the work moves tangential to the cutter, transverse shaving, in which the work is reciprocated axially, while feed is radial, and traverpass shaving, a combination of underpass and



transverse shaving. Ability to select any of the three methods makes it possible for the 870-A to finish narrow, wide, shoulder type, crowned or curveshaped gears, plus either short or long involute splines. Selection of the method is accomplished by rotating the slide for the work carrying head into the proper position. Other features of the machine include a quick acting cam lock tailstock for faster loading and unloading, and a new type machine guard with a rotary action lift cover, which shrouds cutter and work during cutting. Both the 870 and 870-A machines handle gears up to 8, 12 and 18 in. Minimum diameter is 1 in. in all cases, with maximum face width of 5 in. on standard centers. Distance between centers is 26½ in. and the machines will take cutters up to 10 in. diam.

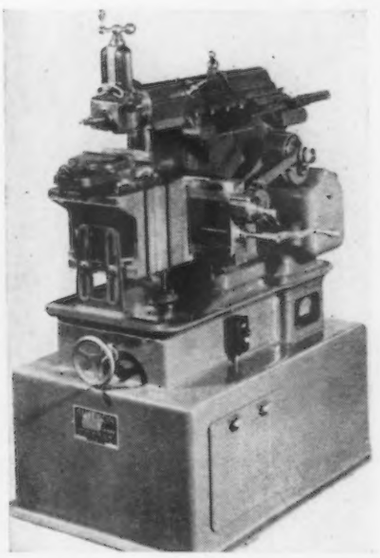
Hydraulic Press

INTRODUCTION of a 1500-ton straight side hydraulic press has been announced by *Verson Allsteel Press Co.*, 9300 S. Kenwood Ave., Chicago 19. Standing 38 ft high, the press measures over 19 ft in length and 10 ft in width. The stroke is 48 in. with 88¾ in. of daylight. Bed area is 96 x 144 in. The press features fast advance to the work with automatic shift to

full pressure stroke, thereby eliminating high speed impact. Reversal is automatic on pressure or distance. Full electrical push-button control is provided for automatic operation with control stations for four operators.

Precision Shaper

ANNOUNCEMENT of a new 12-in. precision shaper designed to fill the gap between the large, heavy industrial shapers and the small bench type machine has been made by *Sheldon Machine Co., Inc.*, 4258 N. Knox Ave., Chicago 41. Its streamlined pedestal fully



encloses a variable speed motor drive which provides all speeds from 12 to 180 strokes per min at the turn of a hand wheel. It has automatic cross feeds in both directions of from 0.0025 to 0.0175 in. A swivel table and swivel vise are standard equipment.

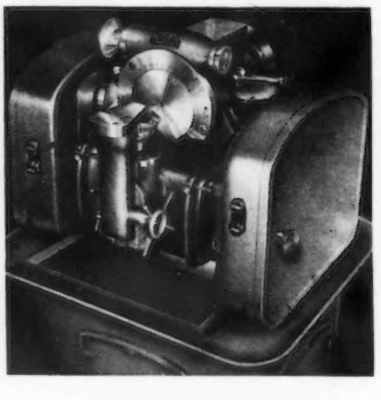
Automatic Screw Machines

HIGH-SPEED automatic screw machines, No. OOG and OG, have been redesigned by *Brown & Sharpe Mfg. Co.*, Providence 1, to increase production. The spindle

is positively driven at all speeds by multiple-width roller chains from the speed and ratio change gears in the base, with the mechanism completely enclosed. The spindle driving chains have predetermined tension adjustment and remain unchanged for all combinations of speed and direction of spindle rotation. The spindle is of unit construction and may be readily removed if necessary. Spindle speeds in 196 two-speed combinations are provided in 16 groups, each group having a high speed with which any one of 12 low speeds can be used in combination. High and low speeds can be forward and backward, both in same direction or in opposite directions, except the 10 combinations giving highest total rpm which can be used only in the same direction. Spindle speeds range from 6050 to 35 rpm. Overload relays with manual reset are provided.

Fine Pitch Gear Generator

DEVELOPMENT of a fine pitch gear generator has been announced by the *Illinois Tool Works*, 2501 N. Keeler Ave., Chicago 39. Combining the outstanding advantages of both the shaping and hobbing methods of gear production, and designed primarily for producing fine pitch involute gears, either spur or helical, the machine will generate any form produced by conventional methods, it is reported. Extreme tool simplification contributes to the accuracy of finished work. The generator will produce gears varying from the smallest practical diameter up to 3 in. over a 30 to 200 pitch range. Adaptable to semi or fully automatic magazine feeding, it will handle blanks or stacks of blanks up to ¾ in. thick.



Polishing Lathe

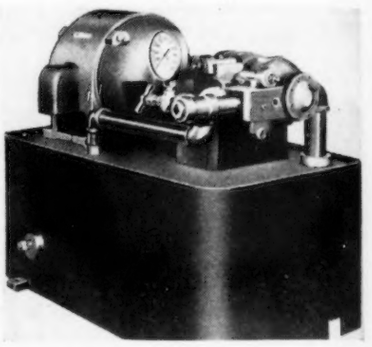
EXTRA heavy duty construction has been developed by *Standard Electrical Tool Co.*, 2505 River Rd., Cincinnati 4, on the proper speed buffing and polishing lathe, to satisfy the increased capacity required when using semiautomatic fixtures. The machine illustrated is equipped with a 50 hp 1800 rpm motor on hinged bed plate inside the base. Power is transmitted to the work spindle through a multiple V-belt drive. Hand adjusting screw at the rear permits placing the correct tension on the V-belt drive. Diameter of the spindle between flanges is 2 in.; distance from base to inside of wheel is 8½ in. Spindle speed is selective. Other sizes in this extra heavy duty range are 20, 25, 30 and 40 hp. Equipment includes magnetic starter having overload and undervoltage protection.

Two-ton hydraulic vise

A LIGHTER and more compact foot-power hydraulic vise which permits the operator to keep both hands on the job at all times, has been announced by *Munton Mfg. Co.*, Franklin Park, Ill. Manual cranking is eliminated and the operator tightens the jaws with one pedal and releases them with the other. Overall height is 3 in., depth of jaws, 2 in., max jaw opening, 2½ in., overall length, 15 in. Structural features include welded construction, hydraulically operated foot-control unit, and long base for rigidity. The vise has slotted lugs for milling machine, drill press or bench. A block or stop of any size may be inserted in back of jaws to control opening.

Hydraulic Power Unit

PRODUCTION of improved types of standardized hydraulic power units for use in conjunction with hydraulic cylinders and other hydraulically operated equipment is announced by *Hannifin Corp.*, 1101 S. Kilbourn Ave., Chicago. The units provide for any required pump capacities from 1 gpm up, and for pressures to 2000 psi or more. Standard equipment includes pump, pressure relief and adjusting valve, flexible pump-motor coupling, and hydraulic pressure gage. Standard motors are used.



Tap Grinder

DESCRIBED as a complete tap reconditioning machine, Model 1100 tap grinder offered by *Henry P. Boggis & Co.*, 1279 W. 3rd St., Cleveland, sharpens and relieves chamfers, grinds flutes and spiral or gun points. The machine has a capacity of No. 2 machine screws to 1½-in. hand taps and ⅛ to 1-in. pipe taps, by the use of three sizes of chamfer and flute heads. Taps with 2, 3, 4, 5, 6, or 8

flutes, and right or left hand threads can be sharpened. Taps are held in precision collets by the shank for reconditioning after the center has been destroyed or the tap broken. Chamfer sharpening is done on the left hand side of the machine and one complete revolution of the hand wheel grinds and relieves all lands. Any chamfer angle from 5° to 60° can be obtained, it is said. Flute sharpening and spiral or gun pointing is done on the right hand side of the machine, and the flute sharpening head has a vertical travel in front of the grinding wheel. Permanently mounted diamond dressers are furnished for truing the chamfer sharpening wheel and forming the radii of the flute sharpening wheel.

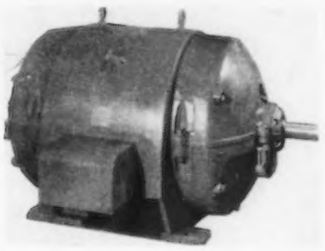
Vibration Loading Device

DEVELOPED for their centerless and centerless thread grinder, *Landis Tool Co.*, Waynesboro, Pa., has announced a loading device which employs vibration for aligning screw blanks or similar parts and introducing them into the machine. There are no mechanically moving parts and wear is confined to the contact surface between the blanks and the hopper.

These blanks move in a circular, inclined ramp on the inside face of the hopper wall, until they enter the feed tube at the top of the hopper. A relatively long path of travel aids in aligning the blanks before they enter the feed tube. Blanks which are not aligned fall back into the hopper without slowing up the flow of blanks toward the feed tube, it is reported. Vibration is obtained through ac current rectification. Rate of feed may be adjusted from creep to full speed through a rheostat knob.

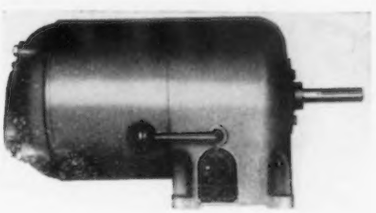
Induction Motor

AN ADDITION to the heavy-duty line of motors manufactured by *Electric Machinery Mfg. Co.*, Minneapolis 13, is a 2-pole, 3600 rpm, squirrel-cage induction motor for high-speed applications such as boiler feed, pumps, oil pipe line pumps, centrifugal pumps, compressors and blowers. The motor is rated from 200 to 700 hp at 3600 rpm; NEMA Class B starting, normal torque, low current, favorable for across-the-line starting. Dripproof construction is feature with a fabricated steel frame.



Gearshaft Drive

FOR single phase operations of machinery requiring selective speeds *Electric Motor Co.*, Lima, Ohio, has announced the Type R gearshift drive with integrally mounted single phase motor. Type R units are available in sizes of ½ hp at 1200 rpm and ¾ hp at 1800 rpm. Gear ratios of the type R are 1:1, 1.33:1, 2:1 and 4:1. The gearshift drive will operate on 115 and 230 v ac, 50 and 60 cycle. Mechanically the single phase and polyphase units are identical.

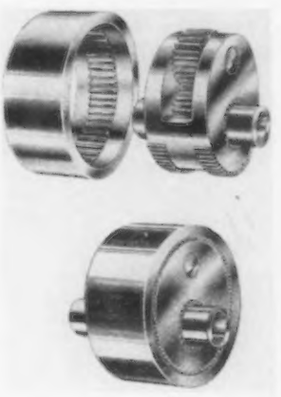


Air Screw Drivers

MODELS 7037 and 7039 air screw drivers for No. 4 to No. 8 wood or machine screws have been added to the line of industrial air tools manufactured by the *Aro Equipment Corp.*, Bryan, Ohio. The tools incorporate a new friction clutch attachment, using ¼-in. hex shank bits or ¼-in. hex adapter with square drive for nut setting. The friction clutch attachment is designed to permit a greater travel range of the adjusting nut, which controls the tension of the clutch spring. Required tension is attained by adjusting this nut to drive screws or nuts to the desired torque requirements. Friction jaw angle is said to be such that jaws will slip freely when adjustment or tension is at a minimum or maximum. Overall length of the tool is 8¼ in. and weight is 1¾ lb. Speed is adjustable to 1800 rpm.

Epicyclic Drive

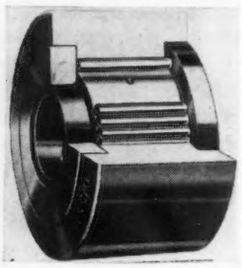
CONVERTING high rotating speeds into slow reciprocating motion can be accomplished, it is reported, by means of the epicyclic drive developed by *American Brake Shoe Co.*, 230 Park Ave., New York 17. The drive is built as an integral unit on anti-friction or plain bearings, depending on power requirements. Design of the drive permits considerable flexibility in both speed and stroke, it is pointed out, making possible the use of built-in or direct drive input power where desirable in streamlining or packaging. Multiple units of different gear ratios and strokes may be mounted on a common power shaft. One geared epicyclic unit used in conjunction with a master connecting rod lends itself to radial design in either vertical or horizontal positions, the unit itself replacing the master rod bearing. Where syn-



chronous speeds are required, rolling members may be substituted for the gears.

Cam Yoke Roller Bearing

THE Multirol cam yoke roller bearing announced by *McGill Mfg. Co., Inc.*, Valparaiso, Ind., is a cam-follower type bearing built with an inner race to increase adaptability where mounting by the



conventional cam follower stud is undesirable. Shaft sizes range from 0.250 for the CYR-¾ to 0.125 for the CYR-4. The bearing is said to have an extra heavy outer race section and a full compliment of small diameter rounded end rollers. Length is said to be fully usable to provide maximum load carrying capacity.

Miniature Dynamometer

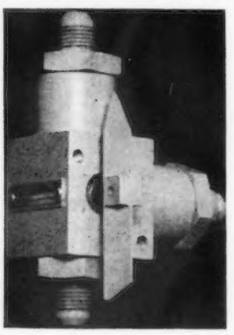
TO measure tension or force in tight spots found in many types of mechanical assemblies, a miniature dynamometer has been developed by the *W. C. Dillon & Co., Inc.*, 5410 W. Harrison St., Chicago 44. The case measures 3 in. in diam; the instrument weighs 1 lb. It is available in 100, 250 and 500-lb capacities; has an unbreakable lucite crystal and red, maximum hand. The dial is black with etched silver numerals.

Pressure Switch

DESIGNED for the control of high pressure hydraulic, air and steam systems, the Hi-Pressure switch brought out by *Diaphlex Div.*, Cook Electric Co., Chicago 14, is recommended for application as warning and control signals on punch presses and steam boilers. The circuit of this switch may be supplied to operate at 5 to 50, 50 to 200, 200 to 500 and 500 to 2000 psi. The pressure differential between on and off position is said to be approximately 10 pct of operating pressure. Switching mechanism is housed in an aluminum casting and pipe connection is solid brass with a beryllium copper diaphragm brazed on. Metal parts are cadmium plated where necessary. Maximum surge is 2500 psi.

Fuel Selector Valve

A POSITIVE position, positive sealing fuel tank selector valve announced by *Electrol, Inc.*, Kingston, N. Y., was developed primarily to control aircraft fuel lines but is recommended also for air, water, oil and gasoline systems. The valve, known as Model 544, is designed to assure positive positions of the control handle by means of built-in detents and incorporates a poppet-type valve to assure free operation and elimi-



nate sticking. The unit has low pressure drops and connecting fittings that are integral with the unit. The housing is made of aluminum alloy with anodized finish and port sizes may be varied to suit individual application.

High-Temperature Insulation

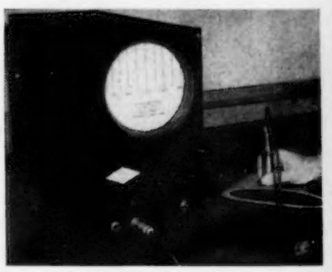
DEVELOPED to withstand temperatures up to 1800°F, a line of lightweight high-temperature insulating materials in felt and bulk form released by *Owens-Corning Fibreglas Corp.*, Toledo 1, is composed of specially processed filaments of glass. The products are designed for industrial, marine and aircraft applications where a need exists for a flexible, removable type of insulation that will maintain integrity and withstand physical deterioration at extremely high service temperatures such as for jet engine cones and tail pipes. In felt or bulk form, the materials were developed for insulating housings and flange covers of high-temperature steam turbines, and exhaust manifolds and turbo-supercharger housings on oil or gas-fired supercharged 4-cycle Diesel engines. In other applications they are said to take the place of refractories.

Liquid Plastic Finish

WATER-CLEAR, liquid plastic finish that makes it possible to protect the painted or varnished surfaces or finished metal parts of machines with a brilliant, durable coating has been announced by the *Reyman Plastic Products Co.*, 1525 E. 53rd St., Chicago 15. It is claimed the liquid finish is impervious to heat, cold, moisture, alcohol, alkalis and most chemicals. It serves as an anti-rust and paint preserver. The liquid plastic can be applied with a cloth to machinery. The finish is touch dry in 30 min and hard dry in 6 hr.

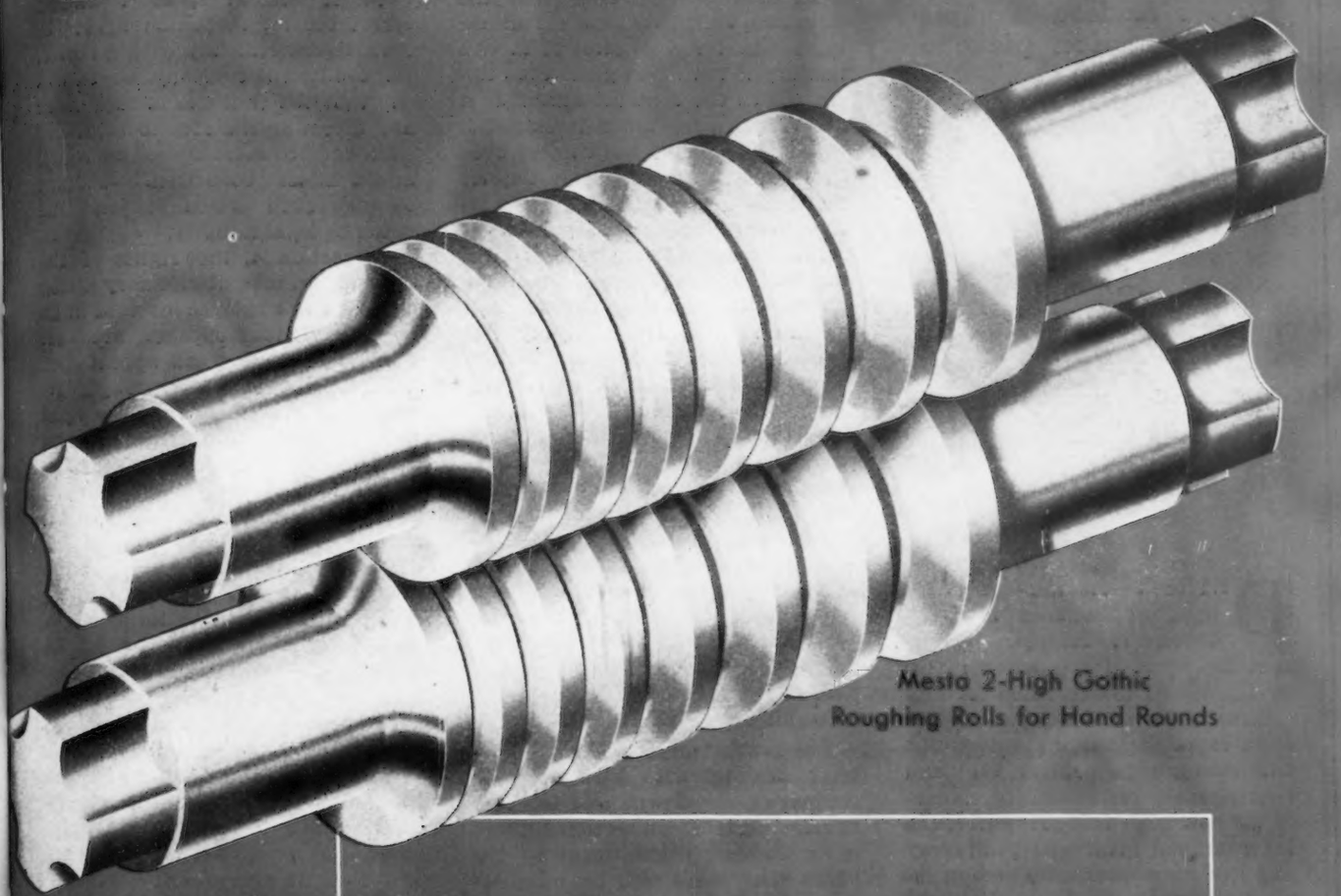
Thickness Tester

THE Reflectogage, an instrument utilizing supersonics for thickness measurement and flaw detection, has been announced by *Sperry Products, Inc.*, Willow Ave., Hoboken, N. J. Thickness of metals and other materials can be measured with this instrument where access from one side only is available. Maximum error in measurement is said to be less than 2 pct of the thickness of the material. Thickness of tubing and flat parts between 0.005 and 0.300 in., can be read directly from the face



of the oscilloscope screen. Indirect reading of the thickness of parts up to 4 in. may be accomplished with slight calculation, it is stated. The Reflectogage is said to be adaptable also for production line testing of thin pieces, or bonded or clad materials, for internal defects or separations.

MESTA ROLLS



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Assembly Line . . .

WALTER G. PATTON

• Union resistance to liability clauses in the Taft-Hartley law appears to be weakening . . . Hudson workers ignore union plea to stop heat strikes.

DETROIT—As the Taft-Hartley bill becomes effective, there are increasing signs that the front of opposition raised by UAW-CIO to the union liability clauses of the act has been broken. It is expected that the auto union will continue to protest loud and long against responsibility clauses of the new labor law. However, the International Harvester, Murray and Reo agreements are strong indications that the UAW-CIO will accept responsibility under conditions where the union can be reasonably expected to control the situation.

For example, as most observers here see it, a very narrow margin of liability is recognized by the union in the new International Harvester agreement. Under the terms of this agreement, the union can avoid liability if it complies with the terms of the contract and posts a notice directing the men to return to work. These notices on bulletin boards will direct the union members to return to work and "cease any action which may affect production." If asked to do so by the company, the union has agreed further that it "will take such further steps as it, in its discretion, considers reasonable and appropriate under the circumstances to bring about compliance" with the notice.

As most sources here view the situation, the International Harvester contract waives most of labor's liability if the union gives even lip-service to the contract although it does require the union to establish whether or not it has control over its membership and clearly implies that labor's responsibility goes further than merely posting a notice.

The Murray agreement goes much further in establishing union responsibility. During the 28 days of negotiation, the company has consistently taken the position that there were certain things clearly beyond the control of the union and for which it should not be subject to damage suits. Murray has insisted however, that the union should be held legally responsible for actions within its control. Sticking to its guns on this point has apparently made a vast difference in the kind of a contract that was finally written. At the beginning of the negotiations, the union had held out unconditionally for relief from all union responsibility.

The portion of the Murray contract dealing with strikes, work stoppages, slowdowns and lockouts has five sections. In section 1, there is an absolute commitment by the union that there will be no slowdowns or sitdowns during the life of the agreement. Section 1 also specifies there will be no strikes in connection with (1) production standards, (2) management's rights (as specified in the agreement) or (3) attempts to change or add to the contract. The union is liable in the event of an authorized strike on any of these three issues.

THIS section further provides that the union will not authorize a strike or picket the company until the grievance procedure has been complied with and the strike approved by the international union. At least 45 days must elapse after the filing of a grievance before a strike can be called. Again, according to the company, the union is legally liable if a strike is called in violation of this provision.

Section 2 exonerates the union for wildcat strikes if it fulfills its commitments.

Under section 3, if a wildcat strike occurs, the union agrees to furnish the company with a notice, for use by the company, which will say that the strike is unauthorized and directing the men to return to work and "to cease any action which might affect production." Failure to take such action subjects the union to legal liability.

In section 4, the rights of the company to take disciplinary action against any employee involved in an unauthorized stoppage are set forth. The union can appeal such disciplinary action through its grievance procedure but agrees not to take strike action within 45 days.

In section 5 the company agrees not to lockout employees over any issue without at least 5 days of negotiations at the top level of the grievance procedure.

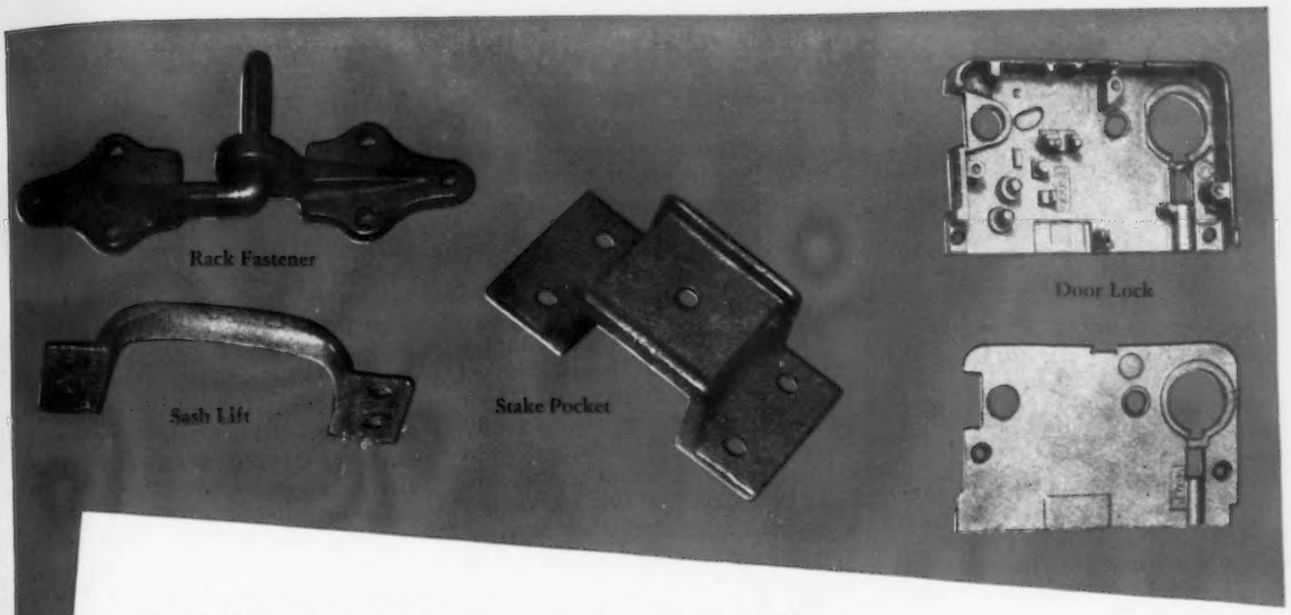
IN RELEASING the terms of the agreement to the press, C. W. Avery, president of Murray, said: "We feel this agreement is a fair solution to a difficult problem. It provides that the union is fully responsible for failure to live up to its contract; it limits the union's legal liability to acts for which the union can reasonably be held responsible; it provides for management discipline of individuals for whose conduct the union is not responsible."

Mr. Avery pointed out that in the 10 years of bargaining relations between the union and the company, the Murray strike just concluded is the only authorized strike.

The union won its demand for elimination of an arbitration clause proposed by the company. In addition to rate readjustments in Murray's plant at Belding, Mich., a 15¢ wage raise was agreed upon rather than an 11½¢ pay boost and paid holidays for hourly workers.

The new Reo agreement goes considerably further in establishing union responsibility.

If a wildcat strike takes place, the union will "not give any aid, encouragement, support, or assistance, including use of any union facilities or financial support, to the violators or in furtherance of such violation."



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The UAW-CIO has agreed in the Reo contract to "try promptly and diligently" to settle a wildcat. Within 24 hr of notice by the company the union agrees "to disavow the action by public notice to all members and written notice to the company and will direct all of its members to return to work under the terms of this agreement." *Failure of any worker to return to work when called by the company constitutes a voluntary quit by the employee. Under the contract, the employee has no rights beyond this.*

The union agrees to carry disputes on discipline or discharges through the grievance procedure and grievances will not be filed until the union has made an investigation.

Finally, the Reo agreement carries an arbitration clause. The umpire's decisions are final and must be observed if legal liability is to be avoided. Workers agitating a strike are punishable as Reo sees fit. If an illegal strike occurs, the company can cancel the entire agreement.

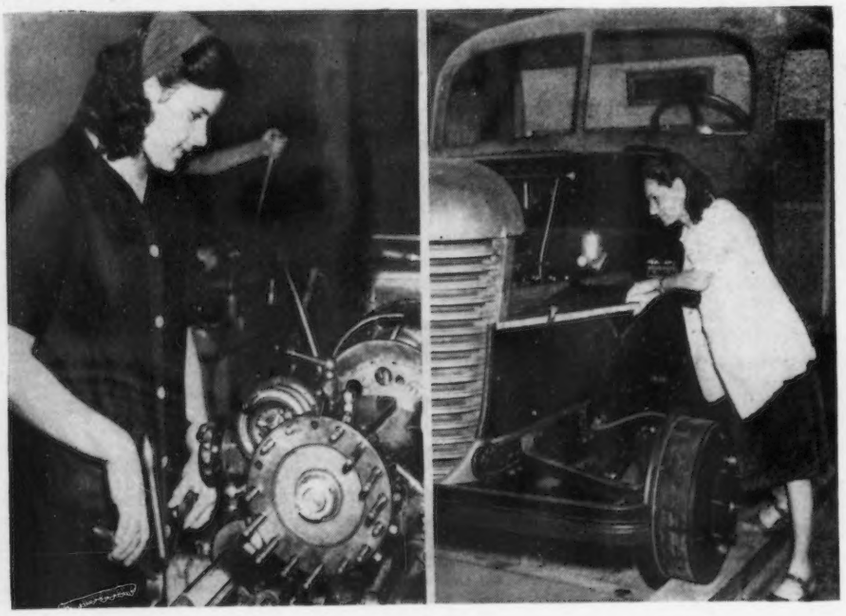
As in the Murray and Harvester agreements, the union agrees to take active steps to end unauthorized strikes. The union must comply with decisions by the umpire. It agrees that workers taking part in unauthorized strikes can be disciplined or discharged.

AS MOST observers see it here, the Reo agreement places the company in the strongest position of any company seeking to find a satisfactory agreement under the liability clauses of the Taft-Hartley bill. As such, the Reo contract may very well set a pattern which other auto producers will attempt to follow in dealing with the union's efforts to avoid responsibility under the new labor laws.

There is further evidence that a sense of union responsibility is growing in the automobile industry—some of it imposed by the union itself. For example, last week notices were posted on the UAW bulletin boards at Hudson calling attention to the fact that most of the members wanted to do a full day's work. However, because of numerous heat strikes production was spotty. The families of many workers were feeling keenly pay lost because of idle time stemming from the heat strikes. The notice stated unequivocally that specific procedures must be followed in the case of strikes. The president of the local also said: "Other than that, I am of the opinion the members will not tolerate minority groups or individuals taking unfair advantage by slowing down key positions to the detriment of the majority membership."

The next day another heat strike closed the plant down but the mere fact that the union president saw fit to call this condition to the members' attention publicly appeared to be a marked gain in the direction of union responsibility.

LADIES OF THE LINE: *The only automobile plant in the Balkans is at Belgrade, Yugoslavia. The girl at the left is working at a lathe while at right the young miss in the sweater is said to be inspecting a truck engine on an assembly line.*



Bendix Aviation Buys Resinized Filter Firm

Detroit

• • • **Bendix Aviation** Corp. has purchased the assets of Skinner Purifiers, Inc., of Detroit, according to an announcement by Malcolm P. Ferguson, president of the company. Guy C. Fricke, general manager of the Bendix Zenith Carburetor Div., Detroit, will assume the additional duties of general manager of the Skinner Purifier Div.

Ralph Skinner, organizer of the company in 1919 will remain with the division in an advisory capacity.

The purchase of Skinner is expected to broaden Bendix production of automotive industrial filters. The Zenith Div. of Bendix produces metal filters while Skinner pioneered resinized paper filters which are capable of screening out particles as small as one-half micron.

To Address Navy Group

New York

• • • **Secretary of Defense** James Forrestal and Senator Leverett Saltonstall will be the principal speakers at the Fourth Annual Dinner of the Navy Industrial Assn. on Wednesday evening, Sept. 24, at the Waldorf-Astoria Hotel, it was announced. Senator Saltonstall, former governor of Massachusetts and now senior U. S. Senator from that state, is a member of the Senate Armed Services Committee and the Senate Appropriations Committee.

Tool and Die Meet Set

Cleveland

• • • **The 1947 annual** meeting of the National Tool & Die Manufacturers Association will be held Nov. 2 to Nov. 5 at the Benjamin Franklin Hotel, Philadelphia.

Arrangements are in the hands of George S. Eaton, executive secretary of the association, and Adolph E. Berdick, Engineering Tool Co., Philadelphia, who is chairman of the convention committee. Willis G. Ehrhardt, Ehrhardt Tool & Machine Co., St. Louis, is president of the NTDMA.

General membership sessions will be held Monday and Tuesday, Nov. 3 and Nov. 4, with sightseeing trips on Nov. 5. Committees and the board of directors will meet Nov. 2.

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Isothermal Bulletin #113 contains complete details and will be sent on request, together with reprints of pertinent technical articles.

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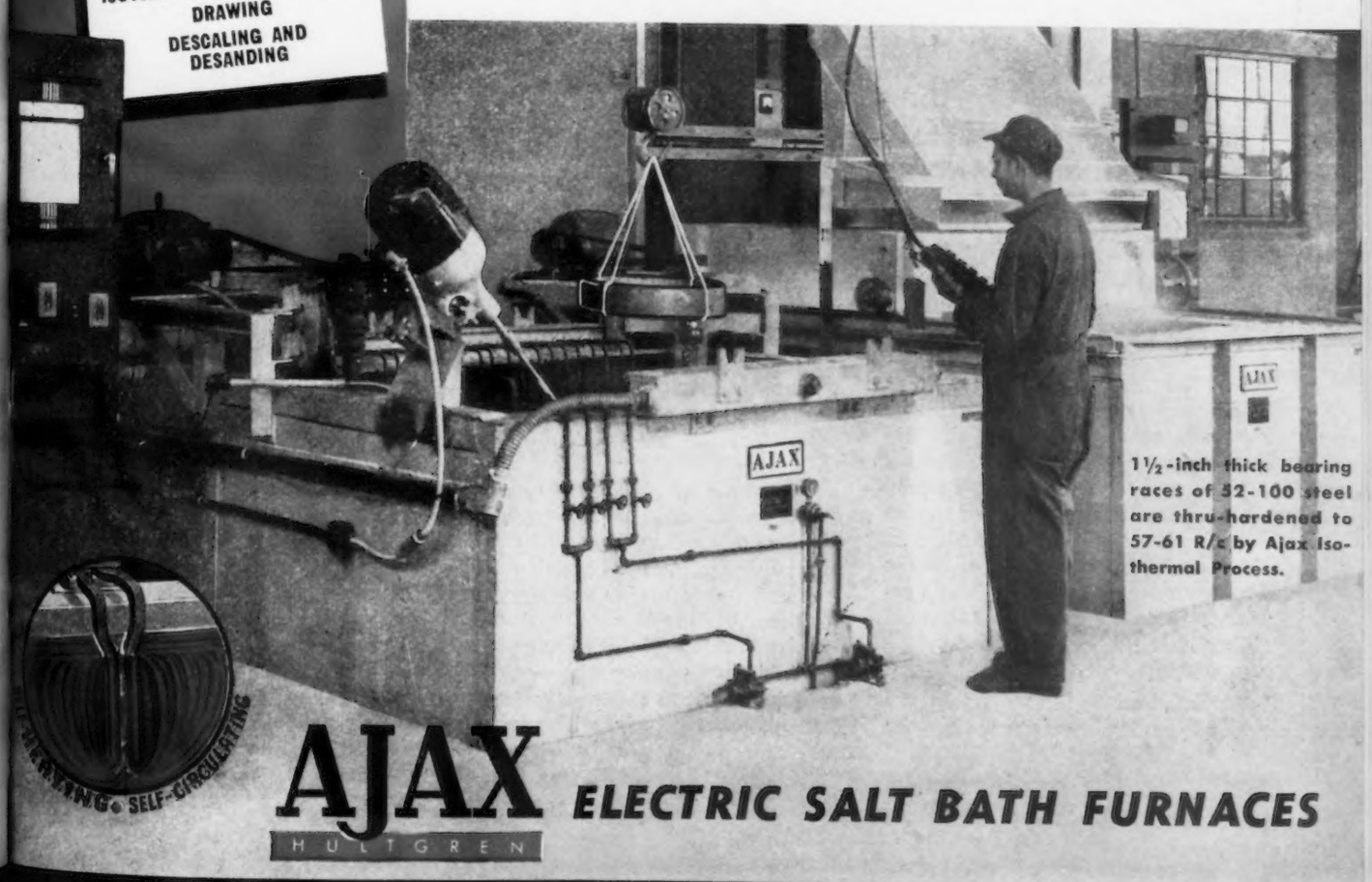

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AJAX HULTGREN **ELECTRIC SALT BATH FURNACES**

Washington . . .

EUGENE J. HARDY

• German and Austrian scientists may be lost to nation . . . Military fumbles ball . . . Displaced persons problem still active . . . Many DP's technically skilled . . . Budget cuts necessitate slash in federal services.

WASHINGTON — A substantial number of the several hundred German and Austrian scientists and technicians now working in this country under Army and Navy contracts is being tossed at industry by the armed services, but the amazing thing about the whole deal is that industry knows little about it and is not likely to learn much due to the bungling public relations policy of the Army and Navy.

Two reasons have been advanced for the decision of the Army and Navy to release a number of these men to industry under contract: (1) The available funds for this work are not sufficient to allow the continued importation of additional scientists in addition to carrying on the work already under way; and (2) The particular jobs for which some of these men were brought to the United States have been completed. According to the services, only four of these foreign scientists had been released to industry at the time of this writing.

One of the reasons for the reluctance to discuss the matter on the part of the services is probably the fact that many of the men working in this country still have families in the Russian occupied zones of Europe. Still, critics of the Army and Navy policy point out that it would be possible for the services to release a list of these men, referring to them in regard to their skills, rather than by name.

Unless the desires of the services are made known it is likely that the potential national asset which lies in the skills of these 400 Germans and Austrians might be irretrievably lost.

TO THE credit of the services is a new policy which got under way in June of this year under which industry was permitted to select scientists and technicians in Germany and Austria to be brought to this country under government-approved contracts. This policy represented a 2 year effort on the part of industry and personnel in the technical branches of the service.

But here again, the services fumbled the ball, for with only seven individuals on their way as this issue went to press, the War Dept. had set Sept. 30 as the cut-off date for applications from industry to procure personnel in which they had expressed an interest. Officials in the War Dept., who backed this policy are now fighting for an extension of this period. Their success will depend in a large degree upon the backing they receive from industry.

No official reason has been advanced for arbitrarily cutting off this program, but it has been suggested that it may be due to the belief on the part of some officers that the cream of the technical brains in Germany and Austria has been skimmed off by the Russians as well as the British and Americans, who have been working jointly on the program. This is refuted by civilians working on the program in Europe. They report that the British are going ahead with a well-rounded program for utilizing the services of these men and that hundreds of individuals are still available in Germany who would be a distinct asset to research in American plants and universities.

THE men now working in the United States represent almost every phase of technical knowledge. For example, one of the largest groups is working on synthetic fuels. Chemists, metallurgists, and aircraft experts are also included. One specific project involves adapting steel plate to precision forging.

The smaller number coming to this country under direct contract to industry, as distinguished from those who are released to industry by the services, must be cleared by the War Dept. before they are cleared for passage. If the theater commander in Europe declares that any of the men requested are essential to the rehabilitation of Germany or Austria they will not be allowed to leave the country.

Once cleared by the War Dept., these men are the responsibility of the contracting firm under the terms of War Dept. contracts which are extremely rigid. The service of the individual must be in the interests of national security, his specific employment must be carefully outlined, his transportation and housing must be secured by the contracting firm, and, finally, the government has exclusive rights to all patents and inventions originated by the inventor for a period of 2 years from the date of contract. This latter provision has not set too well with the firms who have been made aware of the program and are interested in procuring the services of specific German and Austrian scientists and technicians.

* * *

ANOTHER problem relating to foreign nationals is the displaced persons question. That this situation will arise again in the next session of Congress is a foregone conclusion. The administration is fighting to permit entry of some of these people into the United States, if for no other reason than to show the rest of the world that this country is sincere in its efforts to solve international problems. President Truman's appointment of Immigration Commissioner Ugo Carusi as a special assistant in the State Dept., to survey the displaced persons problem is further evidence of administration concern.

The United States is responsible

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Operation: Cutting 44" herringbone gears.
Machine: Dominion herringbone gear generator.
Materials: Stainless steel, high carbon steel, bronze, other alloys.
Cutting Oil: Sunicut.

This case is just one of thousands in which experienced production men have found that Sun "Job Proved" cutting oils help to increase production and to improve quality as well.

Sunicut is a clear, free-flowing cutting oil, produced by an exclusive Sun process. It has high lubricating value and has excellent heat-dissipating and anti-weld properties. It makes possible heavy cuts at high speed while accuracy and satin-smooth finish are maintained. For full information call your Sun Cutting Oil Engineer or write Department (1A-8).

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for about 600,000 of these people in Germany, Austria, and Italy. More than 500,000 of them are in the U. S. Zone of Germany. The Stratton bill which was passed over by Congress prior to adjournment would permit 400,000 displaced persons to enter the United States over a period of 4 years under unused immigration quotas, provided all normal immigration restrictions could be met.

This bill is still alive and proponents of the measure are marshaling their weapons for a fight next January. One of their big guns is the fact that most of these people possess skills which could be used to advantage in this country. Emphasis on this point will probably smoke out the AFL and CIO whose support has been somewhat halfhearted.

Bearing out the contention that these people are above the average in regard to professional skills is the policy of the Nazi Labor Office of bringing into Germany only those people who were capable of working in factories and on the farms. In the average DP camp there are relatively few old people or physically handicapped people.

Of about 150,000 DP's living outside camps, the U. S. Army has about 40,000 employed in labor-service companies; 90 pct of these are skilled labor.

An Army survey of the employable DP's (more than 300,000) lists approximately 140 specific skills under 17 occupational categories. The largest number, 24.5 pct, is skilled in agriculture, forestry, dairy and food processing. Laborers comprise only 2.4 pct of the total. Metal trades account for 2.1 pct. This category includes electroplaters, foundrymen, forgemen, heat treaters, machine operators, machinists, metalsmiths, mill wrights, welders and toolmakers. Those skilled in communications, transportation, and supply comprise 7.6 pct of the total, and 6.7 pct are skilled in construction and maintenance. In fact, every skill known to man is represented in the DP camps. In the professional groups can be found agronomists, chemists and civil, electrical, industrial, mechanical, and mining engineers making up 6.4 pct of the total.

* * *

ONE of the primary administration objections to budget cuts lays in the belief that such cuts would result in the elimination of services essential to all segments of the public. The Republican reply was to the effect that no one knew whether many of these services were in fact essential and that the only way to find out was to eliminate them. The appropriations cuts enacted during the last session of Congress will determine which faction was right.

That services have been cut is undebatable. Services to business have been slashed considerably and objections to further cuts have already been raised. The Bureau of Labor Statistics is an excellent example. Budget reduction has resulted in complete elimination of several programs planned by BLS during the current fiscal year and brought about considerable curtailment in others. Also, in order to stay within its appropriations, BLS has eliminated three of its eight field offices — Denver, Dallas and Cleveland. Still in operation will be New York, Chicago, San Francisco, Atlanta and Boston.

Included among the eliminated programs were six machinery group indexes, the special studies on working conditions, local housing statistics, export and import indexes, work and wage experience surveys, technological developments digest, labor requirements studies in the building materials industry, and studies of labor and management organizations.

AMONG the programs which are continued without substantial change are the consumers price index although the cities covered will be reduced from 21 to 10; employment and payroll series; wage statistics; construction and housing statistics; and the wholesale price index.

Some other activities, such as compiling facts and figures about the family budget of city workers, will be carried on but on a limited scale. Similarly, work is being continued on a reduced scale in compiling productivity indexes, occupational and industrial outlook studies, labor economics research, foreign labor conditions research, and state programs for employment and industrial relations.

However, the BLS is required to maintain a file of copies of all available collective bargaining agreements and actions reached under such agreements for the settling or adjusting labor disputes. All are open to inspection under stated conditions.

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Behemoth Bigness *with a "Tiffany Touch!"*

The Bryant No. 150 vastly increases the scope of precision internal grinding. With this rugged machine, you may now grind parts up to 60 inches in diameter with a maximum hole depth of 16 inches. In spite of its size, the No. 150 is a precision production machine with "finger-tip" control. Positive alignment is assured by the use of the well-known Bryant 3-point wheel slide suspension. A preloaded anti-friction cross slide gives smooth cross-feed—either by hand or power. A hydraulically operated wheel slide simplifies gaging and loading and unloading of large work pieces.

In a single chucking, the new No. 150 can grind a bore, or a bore and face—the bore may be either straight or tapered. Hardened and ground slides give the work head 24 inch movement axially and crosswise to simplify finishing long work or large diameter work. Outside diameters, or outside diameters and faces can also be finished in one chucking. Spacer blocks can be inserted between the cross-feed screw and the cross slide to obtain a second setting for a counterbore or face grinding operation. A copy of Bryant No. 150 catalog sheet, giving full details, is yours for the asking.

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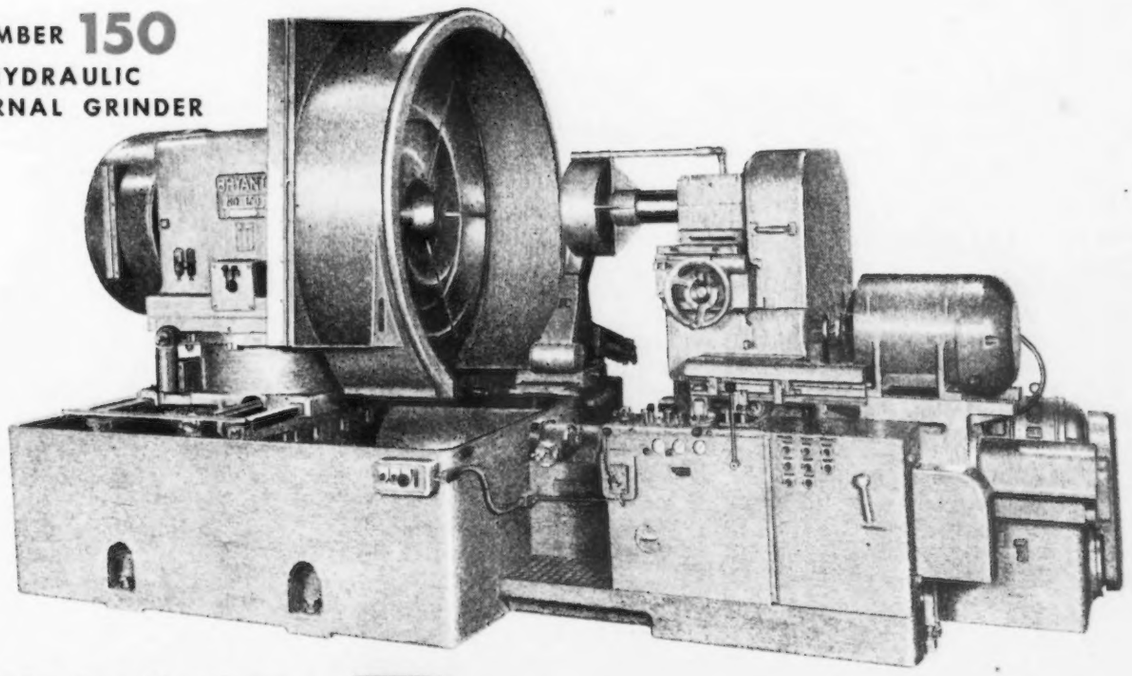

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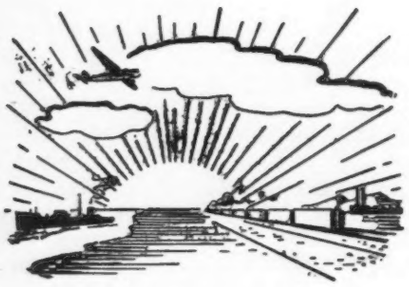
West Coast . . .

ROBERT T. REINHARDT

• Industrial machine may be slowing down to its future normal level of operation . . . War gains in aircraft engine design may be lost, expert warns.



SAN FRANCISCO—There are some signs that West Coast industry, which has been operating with all safety valves tied down and governors removed on the impetus developed by the war, is slowing down to what may prove to be a more nearly future normal level.

In California the Reconstruction and Reemployment Commission in its estimates and forecasts of civilian employment and unemployment to November of this year indicates that unemployment in the state is estimated to have dropped to 390,000 in mid-July, which was 20,000 less than in June. However, July was the first month in 1947 in which unemployment exceeded that for the corresponding month of last year.

In July 1947 there were 175,000 persons drawing unemployment insurance and in July of 1946 only 148,000 were receiving checks. In July 1947 there were 390,000 unemployed as against 350,000 unemployed in the same month last year.

This Commission attributes an increase in unemployment to an enlarged labor force brought about by population growth, decreased employment in agricultural and government work and a less-than-seasonal rise in manufacturing employment.

In the manufacturing division of labor, the Commission indicates that in July of this year there were 732,000 employed whereas in February of 1947 only 718,000 were employed in manufacturing processing. However in projecting the manufacturing employment into November of this year the Commission allows for a drop and estimates that manufacturing employment at that time will be approximately 720,000.

This total employment for the next few months in manufacturing is expected to be generally below that of 1946 primarily because the level in the food processing, shipbuilding, and aircraft industries has been running considerably lower this year than last.

OTHER indications of a slight but recognizable slow-down in manufacturing and heavy industry can be found in steel warehouses where stocks are at least allowed to reach the warehouse floors before being shipped on to customers, and by reports of parts suppliers that orders are coming in more slowly.

No alarm is being evidenced over what appears to be a slight slowdown of the western industrial machine. On the contrary there is ample evidence that this adjustment period is a healthy one and is welcomed by some of the more conservative industrialists.

Heavy construction throughout the West continues at a high rate and will undoubtedly continue to maintain steel operations in a structural and bar field at a high level for some time to come. Western producers see no signs of a reduced demand for any product although the immediate future of the plate market poses a question.

Local interest in the Marshall Plan was stimulated in industrial circles recently when a group of 15 New York newspaper reporters visited the coast to make a survey as to whether this area could contribute anything to the furtherance of the plan without seriously affecting the domestic economic picture. Most industrialists who were interviewed by THE IRON AGE were quite positive in stating that while they were in favor of the plan in general, they failed to see how industry of this area could contribute substantially to the rehabilitation of Europe without jeopardizing or unbalancing the local economy.

As was to be expected, any suggestion that steel sheet shipments to the West be further curtailed in the interests of furthering the Marshall Plan met with howls of anguish and threats of near violence.

To forestall any slackening of industrial development in the Portland area and looking ahead for future developments, an organization known as the Raw Material Survey, Inc., has been organized there with Richard J. Anderson as the managing engineer. The purpose of this group is to accumulate factual data on the sources of raw materials acquired by, and available to, industries in Oregon and southern Washington.

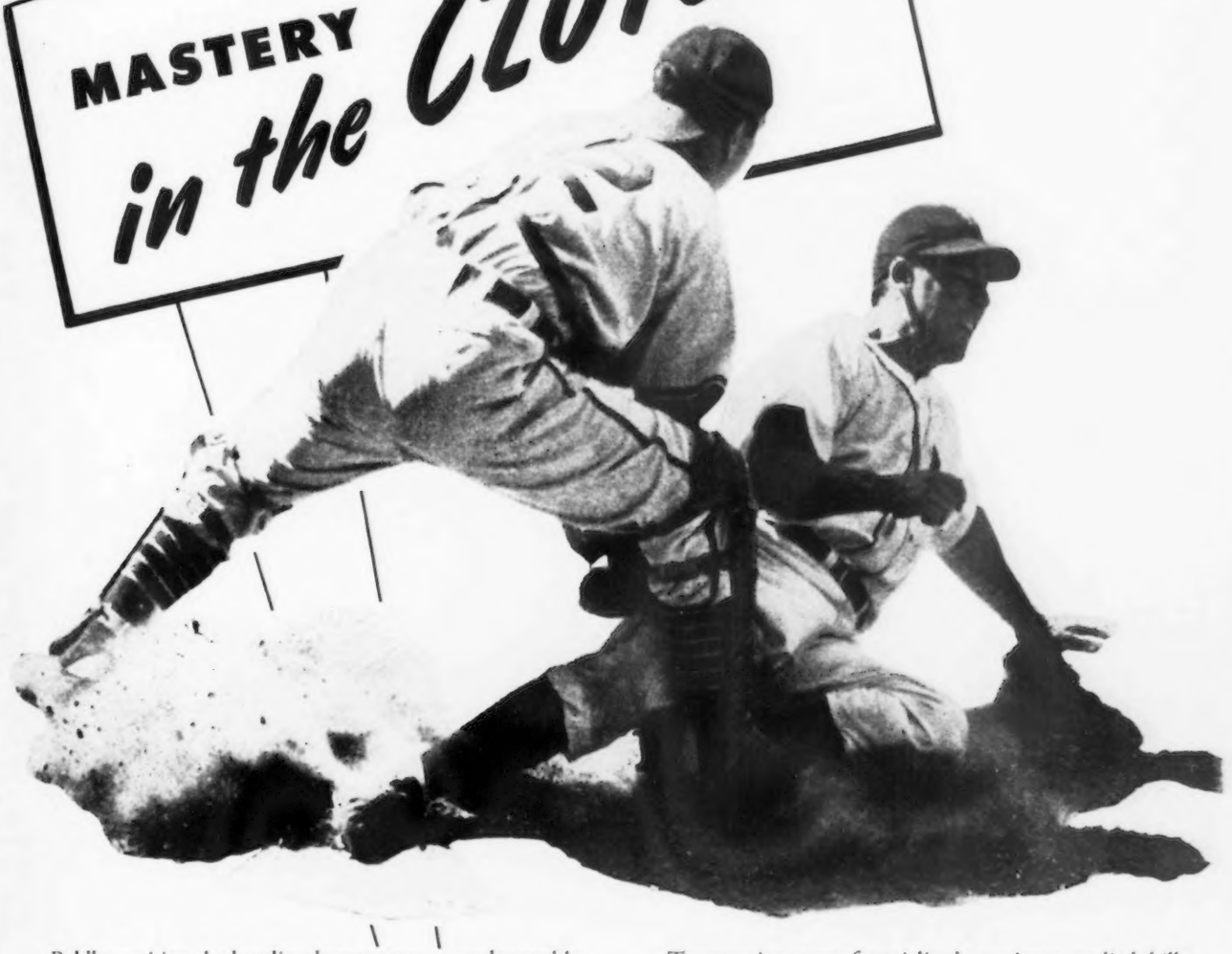
The group already has available information on sources of limestone, iron ore, silica sand, and raw material for rock wool.

Under the nonprofit corporate setup governed by a board of directors consisting of 15 business executives, consulting services are available to supporting agencies which may call upon the managing engineer for information on any raw material.

LOS ANGELES—Future probabilities in aircraft engine developments which will strongly influence the progress of aviation were analyzed by Dr. Milton U. Clauser at the annual summer meeting of the Institute of Aeronautical Sciences.

Using detailed charts to establish his arguments, Dr. Clauser showed that aircraft engine developments follow the same cycles as biological, economic, or sociological progress. These cycles when extended through history show an unvarying pattern that resists influence by temporary forces such as wars, revolutions, etc. The immutable force exhibited by these cycles fixes a trend that can be extrapolated into the future with logical

MASTERY *in the* CLUTCH



Boldly awaiting the hurtling base-runner . . . undaunted by flying spikes . . . expertly timing his block, catch, and tag . . . the professional baseball catcher seldom demonstrates his worth to the team more dramatically than when he cuts off runs at the plate.

Trained talent, a knack for teamwork, and long experience combined with sound management produce the errorless performances that pay off in victories and dividends. Whether you are interested in transmitting power into useful work or directing a successful baseball team, these factors are vital.

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certainty to predict the extent and timing of our progress.

Dr. Clauser pointed out that the accelerated progress achieved by the liberal expenditure of funds for research and development during the war years will be quickly dissipated and the basic trend reestablished, unless the effort and appropriations for research are continued during the doldrums immediately following the war. Thus, unless a farsighted procurement policy is followed in research aircraft, all the benefit of the war expenditure will be lost.

The orderly progression at which the various new types of engines are introduced for general use was also outlined. Past trends show that there will not be a sudden jump from reciprocating engines to jet to rockets with immediate obsolescence of the older types. Rather there will be a logical overlapping progression from reciprocating engines to propeller turbines, to ducted fan turbines, to turbojets, to ramjets, then finally to rockets. Rockets will not reach their optimum usefulness until they power space ships. The advent of atomic power for aircraft will overshadow all other developments.

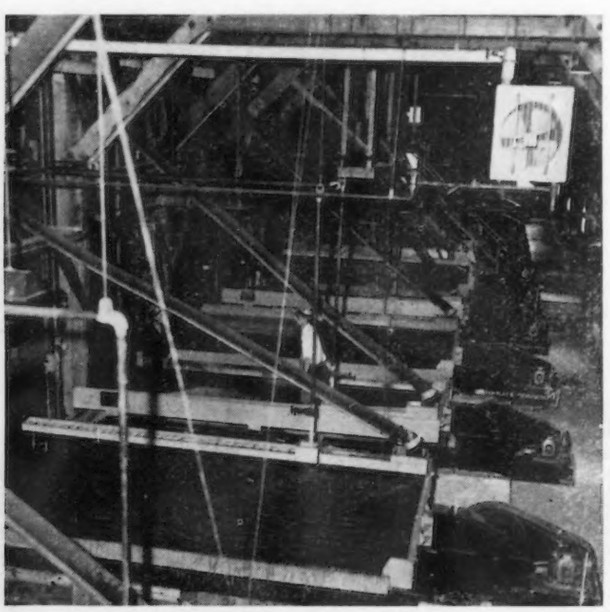
Dr. Clauser analyzed our present position on the long-term progress cycles and said that we are now approaching the end of the current cycle of development which included the advent of X-rays, the automobile, the airplane, and use of electricity. World scientific developments will hereafter progress at a much lower rate with the next 10 to 15 years being unostentatious until the new cycle gets underway. Only a great impetus with a coordinated will to progress scientifically with unrestricted use of engineering facilities and liberal expenditure of funds will succeed in accelerating the advent of the new era.

Dr. Clauser is chief of the mechanical and equipment section of the El Segundo plant, Douglas Aircraft Co., Inc. He supervised design of the power plant installation on the Army and Navy models AD-1 Skyraider, the A-26 Invader, A-20 Havoc, and the Navy's Douglas D-558 Skystreak which recently established a world's speed record of 650.6 mph.

SALT LAKE CITY—Geneva steel plant is back to its precoal mining holiday production rate with all three blast furnaces and eight of the nine openhearth furnaces in operation. The climb back to normal production has been retarded by a short coal supply, arising first from the holiday and later from high absenteeism. The absentee rate has declined markedly during the past week.

Noncaptive coal mines are mostly operating on a 4-day schedule because of a car shortage. Manpower is available for a full operation and absenteeism is abnormally low in these mines.

The nonferrous metal mining picture will be clouded for several weeks yet. Wage negotiations have been practically cleared away but many small mines are in process of adjusting their operations to the loss of premium payments. Present outlook is that the more profitable mines will be able to absorb all manpower released by closing of marginal operations if the men are willing to move.



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REOPENING: *The Ringwood iron ore mines, at Ringwood, N. J., famed for their historic associations, have recently been reopened by the man who purchased them from the WAA. Now employing 200 men, he dreams of a 600 man payroll. The Government spent $4 million on the property during the war.*

o o o

Capital Investment In New Los Angeles Plants Is Near Wartime Peak

Los Angeles

• • • **One of the** most promising features of industrial development in the Los Angeles area today is the fact, that even though the wartime boom is over, last year the capital investment in new industries and expansions of existing plants totaled $156 million which closely approached the record figure of $162 million in the wartime year of 1942.

A study of prewar production and consumption figures of specific commodities in the 11 western states shows that the market for all types of industrial, mining and construction equipment in this area amounted to 10 to 12 pct of the national total, while production was only 4 pct. In other words, sales in this area in the prewar year of 1939 were approximately 2½ times the volume of products manufactured here.

Agricultural equipment manufactured in the West in 1939 amounted to only 1.3 pct of the national total, but sales to western farmers amounted to 14.5 pct. This area processes 13.5 pct of the national output of food products and manufactures only 5.1 pct of the food products machinery.

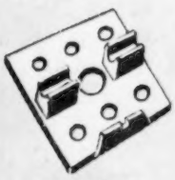
Los Angeles has become one of the largest metalworking centers in the country. In 1939 it produced only 2.1 pct of metalworking equipment. A recent survey by the Industrial Dept. of the Los Angeles Chamber of Commerce shows that there were more than 600 firms in Los Angeles county last year each employing 25 or more persons (some of them more than 500), engaged in manufacturing products from steel. In addition to these companies, there were many smaller concerns working in ferrous metals.

This data was revealed by E. D. Arthur, Domestic Trade Commissioner, to the Southern California Section, A.I.M.E., Institute of Metals and Iron & Steel Divisions.

MULTIPRESS* gives THE ASTATIC CORPORATION

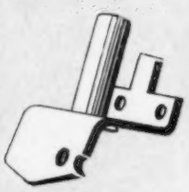
- ✓ LESS OPERATOR FATIGUE
- ✓ INCREASED PRODUCTION
- ✓ IMPROVED QUALITY
- ✓ REDUCED SCRAP LOSS

FORMING



STAKING

BROACHING and PEENING



FLARING and STAKING

RIVETING

ASSEMBLING and CRIMPING

EMBOSSING

BLANKING, FORMING and PIERCING

● Whether you make buttons or bicycles, you'll like the way Multipress increased production, cut scrap loss, improved quality of work, and reduced operator fatigue for The Astatic Corporation, Conneaut, Ohio. Their experiences could easily be applied to *your* plant. This large manufacturer of radio and phonograph parts now uses 14 Multipresses on the wide variety of operations shown at left, plus many others.

For example, in producing a phonograph pick-up arm, Astatic stakes a small brass tube into a serrated hole in a steel stamping. Using a mechanical punch press, they were getting 500 pieces per hour—*but with 25% rejects!* Off-dimension parts were causing either loose assemblies or bulged tubes. Multipress now does the same job at the same speed—*with rejects of less than ½ of 1%*. In addition, Astatic's screw machine department has been able to speed production of the brass tubes, as critical tolerances are no longer necessary. Multipress attains this amazing record through its ability to exert the *exact* pre-set pressure on the work, regardless of dimensional variations. Also, inspection time was sharply reduced all along the line, operator fatigue dropped noticeably, and uniformity of finished pieces was much higher.

Fabricating a microphone diaphragm from .0012" aluminum sheet formerly required many hand operations, holding production to only 60 pieces per hour—with many rejects. Multipress blanks, forms and pierces these diaphragms *in one operation*, producing 300 pieces per hour with almost no rejects!

Multipress is ready to do the same outstanding job in *your* plant. Write today for full information. *Denison has a new deferred-payment contract: if interested, let us know.*

*T. M. REG. U. S. PAT. OFF.

See DENISON at BOOTH 622 MACHINE TOOL SHOW

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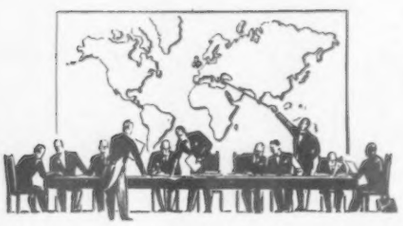
1158 Dublin Road, Columbus 16, Ohio

DENISON EQUIPMENT in APPLIED HydrOILics

European Letter . . .

• The pound sterling has again become inconvertible . . . Convertibility period of 5 weeks was an enforced condition of the American loan.



LONDON — So the convertibility of the pound sterling has lasted only 5 weeks. Some relaxation of the strain had been hoped for in August, but in has not occurred; in the past fortnight, dollars have had to be provided for other countries' requirements in ever-mounting volume; and then the government took what had become the inevitable decision to suspend the obligation to make current sterling available for spending anywhere in the world—an obligation formally assumed as recently as July 15.

There is a strong resemblance between the events of the last few weeks and the story of the restored gold standard after the last war. What was then spread over 6 years has this time been compressed into a smaller number of weeks. But there is the same overhasty decision to restore one of the cardinal features of the prewar financial system; there is the same realization. as soon as the deed is done, that the cost of doing it is far higher than was expected; there is the same struggle to meet the obligation; and there is the same final, sudden and unilateral abandonment of the task.

There are, of course, differences. The return to the gold standard in 1925 was an act of purely British pride; the return to convertibility on July 15 last was an enforced condition of the American loan. In 1925, the great majority of opinion was confident that all would be well; this time, most people had grave doubts—graver perhaps when the loan was negotiated in 1945 than they were as the fatal date of July 15, 1947, approached; for one of the unexplained aspects of the whole affair is how the British government, in concert with their official advisers, managed to work themselves into such a state of confidence during the first 6½ months of this year.

It was necessary, of course, for the purposes of the negotiations with the holders of sterling balances, to put a bold face on the affair. But the confidence was repeated as strongly in private as it was expressed in public. The private observer might have his doubts, but they were melted away by the optimism of those who had access to all the detailed information.

THIS is, indeed, one of the morals to be drawn from the affair —that it is possible even for expert technicians, who have all the available data at their disposal, to be very badly wrong in their estimate of probabilities. Another moral, familiar and almost equally trite, apparently needs constant re-learning—a major war is a very serious shock to a nation's financial and economic organism and too quick a return to the normal habits is likely to delay recovery.

Reprinted from The London Economist by special permission.—Ed.

The figures that the Chancellor of the Exchequer gave in his broadcast recently are enough to show why it was necessary for the British government to act at once and why the discussions that Sir Wilfrid Eady was conducting with the American government in Washington turned out to be merely the occasion for informing the American authorities that the obligation of convertibility had become insupportable. The Americans seem to have shown belated understanding of this inevitable action, taken unilaterally by the British side, but that does not mean that they accept it with any cordiality.

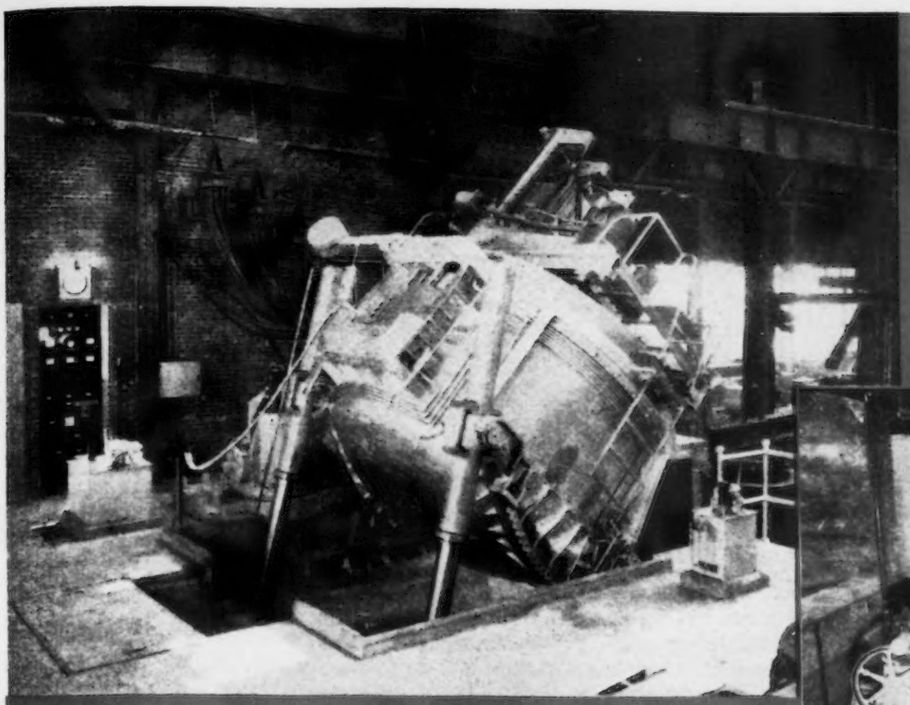
IT WOULD be wrong to say that American opinion as a whole is uninformed about the plight of Europe or insensitive to it. The State Dept., some Congressmen, and the more responsible newspapers, are anxious, sympathetic and eager to discover some method by which the inconvenient logicalities of the American Constitution can be circumvented and aid made available in time. It is a situation very similar to that of 1940-41.

But, as at that time, it is the rest of American opinion that has to be reckoned with, and though there is less active hostility to Britain than at many times in the past (except among the Zionists, who probably do the British cause more good, on balance, than harm), there is equally less willingness to understand why any effort should be made to help.

It would be a waste of time to try to explain to people with this psychological approach that the fault for the present crisis—if fault there must be — is far more America's than Britain's. The loan was far too small when it was made, as the British pointed out at the time. The conditions attached to it were unworkable, as was also pointed out at the time. The sharp reduction in the real value of the loan was due to the rise in American prices, following upon the abandonment of price control in America.

The worldwide dollar crisis, which hurled the convertibility provision into a disaster, is due to the fact that the American balance of payments has got out of control. Nothing could have been done about any of these things by any British action or inaction. Contributory negligence there has certainly been from the British side, but it has been of smaller importance.

BUT if Sir Wilfrid Eady introduced these arguments he was wasting his breath. Congress would not be impressed by them. Indeed, it sometimes seems to the English-



Electrode operating winches and counter-balances are located in a separate room, away from dirt and heat.

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MOORE RAPID *Lectromelt* FURNACES

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- By counterbalancing in the Lectromelt patented friction bite winch system, electrode stresses are greatly eliminated, which results in reduced electrode consumption and breakage. Electrodes are prevented from bearing down against the scrap in the furnace since the friction bite winch system allows the winch drum to turn freely inside its fibre casting without movement of the electrode itself.
- By counterbalancing in the Lectromelt patented friction bite winch system, the winches and motors are removed from the furnace proper and placed either in the transformer room or in a separate compartment where they are free from heat and dust.

These features, and many more, mean efficient, economical operation with Lectromelt furnaces. They are available in sizes ranging from one quarter to 100 tons. Detailed information will be sent upon request.

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man that, so far from admitting any share of the blame for what has happened, the average American is determined to prove the British wrong, whatever they do.

One set of voices asks why they have left matters so late, when Mr. Snyder has been expecting an approach for months past. And another set of voices says that even now, it is far too early to do anything, since the British have not yet scraped the bottom of the barrel of their own ultimate reserves. Why do they not bring precise proposals of what they want? And if they did, they would be told that it is not for the debtor to do the dictation.

Why do they come alone, ahead of the European queue? And if they did not, they would be told that they were sheltering behind others weaker than themselves. Why do they ask for dollars, when what they want is goods? And why do they not realize that it is useless to talk about goods until Congress has made a dollar appropriation? If they are short of dollars, why do they not live within their means? And if they stop buying American films, why does the American government not force them to start again?

American opinion should be warned that over here, in Great Britain, one has the feeling of being driven into a corner by a complex of American actions and insistencies which, in combination, are quite intolerable. Not many people in this country believe the Communist thesis that it is the deliberate and conscious aim of American policy to ruin Britain and everything that Britain stands for in the world. But the evidence can certainly be read that way.

And if every time that aid is extended, conditions are attached which make it impossible for Britain ever to escape the necessity of going back for still more aid obtained with still more self-abasement and on still more crippling terms, then the result will certainly be what the Communists predict, whether or not it is what the Americans intend.

The crippling of the British export trades that was one of the conditions of Lend-Lease increased the dimensions of the aid that was required in 1945. And the famous Articles Seven to Ten of the Loan Agreement, with their obligations of convertibility and nondiscrimination, have brought the British back to Washington earlier and in worse plight than was necessary.

IS IT really the Americans' wish that this process should continue? They should be warned that, every time it is repeated, something more is subtracted from the British willingness to offer genuine cooperation in building the sort of world that Americans want. Do they really prefer a resentful dependency to a self-supporting and self-respecting friend? They should realize that the British government has made very great efforts, and has been willing to run great risks, in agreeing with American conceptions of international economic policy.

No government could have put more of its own interests in pawn to pledge its goodwill; no other government has even tried to make a similar effort. Yet those who would search in Washington for the credit that Britain has earned thereby would need the patience of Diogenes.

For the present, the Americans still retain the power to make the British government jump through any hoop they choose. For it is the ultimate calamity, that, for all the brave talk of standing on our own feet, the misfortunes that would fall upon the British people if there were no dollars at all are such that no British government could face them.

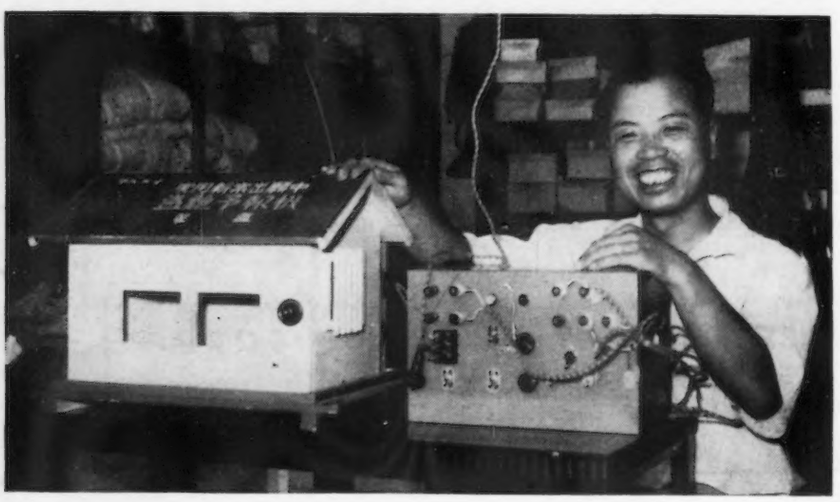
But this dependence will not last forever. A time will come when, by a combination of external events and internal efforts, Britain will be able to do without dollars at a cost that will be bearable. Do the Americans, when that time comes, want the British to regard the cutting loose from America, the erection of barriers against America, as a boon so great that the highest bearable price will be cheerfully paid for it at the earliest possible moment?

They can be assured that there are very many Englishmen who would regard anything of the sort as an unparalleled disaster, as the final and irremediable losing of the peace that so much common blood and treasure were spent to win. But they can also be assured that that is the way things are drifting at present.

MR. MARSHALL, in his great speech at Harvard in June, called on the European nations for a great imaginative effort. They are responding in a more far-reaching way than might have been expected. In return, Europeans have the right to ask the Americans to make an equally great effort of imagination.

Let them forget, for the moment, their own conviction that their present wealth and strength are the result of superior virtue and remember the Europeans' conviction that they are merely due to better luck. Let them worry less about what they can afford to give and more about what they cannot afford not to give. Let them above all try to realize what it feels like to be in other men's shoes.

JAP GADGETS AGAIN: ***This Tokyo mechanic has rigged up this complicated device as a burglar alarm which he says can be used instead of a doorbell during the daytime. The police are conducting tests on the device which can supposedly be made for $100 and uses only an incandescent lamp light source.***



PERSONALS

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• **George J. Buckner** has been appointed assistant general manager of the Bethlehem, Pa. plant of Bethlehem Steel Co., succeeding the late **J. A. Taylor.** Mr. Buckner has been with the company since 1917, serving in various capacities since 1940 as superintendent of the manufacturing division. In this position he is succeeded by **Irvin S. Reiter,** superintendent of heavy forging manufacturing shops. Mr. Reiter has been with Bethlehem since 1915.

• **J. H. Thompson,** superintendent of the coke and byproducts plant at the Fontana, Calif. steel mill of Kaiser Co., Inc., has resigned to accept a position with an eastern steel company. **Clarence R. Lohrey,** formerly assistant superintendent of the coke and byproducts plant, has been appointed superintendent succeeding Mr. Thompson.

• **S. A. Meder** has been appointed manager of the cut nail sales division, Wheeling Steel Corp., Wheeling, W. Va., succeeding L. R. Crago, deceased.

• **E. W. Deck** has been appointed as consultant on manufacturing research of the Borg - Warner Corp., Chicago. Until recently Mr. Deck was general manager of the Trent Tube Mfg. Co. Before the war, he was engaged in research and development on steel production and fabrication processes by the Union Carbide & Carbon Corp.

• **Stephen O. Johnson** and **Robert K. Tucker** are new additions to Wyandotte Chemicals industrial department service forces in the company's Cleveland and Chicago territories. Mr. Johnson joined the Wyandotte Chemicals research department early in 1942. At the close of the war activities he was assigned to the inorganic section of the department. Mr. Tucker joined Wyandotte Chemicals in February of this year.

• **T. O. Liebscher,** secretary-treasurer of the Le Roi Co., Milwaukee, has been elected to a new position of executive vice-president. He joined the firm in 1940 as controller. **Thomas S. Tuttle,** former assistant secretary-treasurer, has been named secretary-treasurer.

• **James E. Smith** has been appointed openhearth superintendent and **Arthur A. Kappenhagen,** assistant openhearth superintendent, at the Cleveland district steel plant, Republic Steel Corp. Mr. Smith started work in the openhearth department at Corrigan-McKinney Steel Co., continued with Republic after the 1935 merger, and has been connected with the openhearth department ever since. He succeeds **Harry L. Allen, Jr.,** who has been transferred to Republic's Buffalo district as assistant district manager. Mr. Kappenhagen has been connected with Republic and Corrigan-McKinney since 1934. He was assistant superintendent of the general labor department before coming to the openhearth department in 1943.

• **W. B. Peirce,** president of the American Society of Tool Engineers, has resigned from the Flannery Bolt Co., Bridgeville, Pa. He is retiring from his post, after 15 years of service as vice-president in charge of research and development, in order to devote more time to the activities of the ASTE.

• **F. A. Loosley** has been appointed vice-president and manager; **F. H. Sherman,** vice-president and works manager, and **E. H. Ambrose,** vice-president, of Dominion Foundries & Steel, Ltd., Hamilton, Ont.

• **Harry E. Weiler** has been appointed manager of the Louisville district sales office of Reynolds Metals Co. Mr. Weiler's first position at Reynolds Metals was as assistant to the general product manager, Louisville. Then he was made product manager of the extrusion and tubing division.

• **Carlton S. Proctor** has been elected to the board of directors of ATF, Inc., Elizabeth, N. J. Mr. Proctor is senior partner in the firm of Moran, Proctor, Freeman & Musser, New York.

• **David K. Miller,** formerly manager of Crucible Steel Co. of America's Baltimore branch, has been appointed a special representative to the branches in the promotion of alloy and machinery steels. Mr. Miller, who has had over 20 years' experience with the company, was previously a representative at Crucible's Philadelphia and Chicago branches.

• **Jerold Van Alsburg** has been made Ohio sales representative for the Rapids Standard Co., Inc., Grand Rapids, Mich. He will maintain offices at Toledo.

• **Robert L. Hutchison** has been appointed general superintendent for Pittsburgh Plate Glass Co.'s Columbia Chemical Div. and for the Southern Alkali Corp., a subsidiary of Pittsburgh Plate Glass Co. Mr. Hutchison has served as superintendent of the Columbia Chemical Div.'s alkali producing plant at Barberton, Ohio, during the past 7 years. He joined the firm in 1925. His headquarters will be in Pittsburgh.

• **George Miller** has been appointed assistant sales manager in charge of truck and tractor seat sales of Monroe Auto Equipment Co., Monroe, Mich. **Charles A. Zanes, George H. Sheehan, Alan F. Cannon and Jack Eddy** have been appointed regional sales supervisors. Mr. Miller has had years of executive experience in motor car manufacturing and merchandising as well as activity in the farm implement field. For a period of approximately 25 years he was with the Chrysler Div. of the Chrysler Corp. During the last year he was sales manager of the Super Six Mfg. Co. Mr. Zanes has been with Monroe for some years as a member of the after market division. Before joining Monroe, Mr. Sheehan was with the Weatherhead Co. as district sales manager in its St. Louis office. Mr. Cannon will make his headquarters in Chicago, and will operate in the territories of the Illinois Auto Electric Co., Chicago, and the Glen T. Lees organization, Minneapolis. Previously he was associated with the McAleer Co., and the Folberth Windshield Wiper Co. Mr. Eddy before coming to Monroe had been sales manager of the American Tire Machinery Co., in Los Angeles.

H. L. BOETSCH, vice-president in charge of sales, Pennsylvania Flexible Metallic Tubing Co.

• **H. L. Boetsch** has been appointed vice-president in charge of sales of Pennsylvania Flexible Metallic Tubing Co., Philadelphia. He was formerly sales manager. **T. R. Boyle** has been promoted to manager of the company's Chicago branch. Mr. Boyle was formerly manager of the Syracuse branch. This vacancy in the Syracuse branch has been filled by the appointment of **J. J. Lynch** as manager.

• **Walter A. Cary** has been appointed to the sales and service staff of the Hanson-Van Winkle-Munning Co., Matawan, N. J. He has taken an extensive training course at the Matawan plant and has now been assigned to the field in the New York State territory.

• **E. Wayne Haley** has been named director of sales for the Southern Alkali Corp. Associated with Southern Alkali since 1935, Mr. Haley has served as assistant director of sales during the past 12 years. As director of sales, Mr. Haley succeeds **Eli Winkler,** who will continue with the firm in the capacity of sales consultant. Mr. Haley will maintain headquarters at New York.

• **William C. Jones,** formerly comptroller of the Alabama Metal Lath Co., has been appointed auditor of Alabama By-Products Corp., Birmingham.

• **H. R. Katzmann,** formerly factory manager of Fredric Flader, Inc., has been named vice-president in charge of production of the American Lubricants, Inc., Buffalo. **E. F. Kieffer,** former assistant treasurer, has been appointed secretary-treasurer.

• **Henry P. Nelson** has been elected executive vice-president and general manager of Menasco Mfg. Co. of Burbank, Calif., and **Gerald Preshaw** has been elected secretary-treasurer. **Donovan H. Tyson** has resigned as executive vice-president, treasurer and general manager. Mr. Tyson was formerly vice-president of U. S. Pipe & Foundry Co.

• **Howard S. Hagen** has been appointed director of industrial relations of the Colonial Radio Corp., Buffalo, succeeding **Charles J. Kolb,** resigned.

• **Charles M. Chuckrow,** formerly executive vice-president of Fred T. Ley & Co., Inc., Springfield, Mass., has been made president. **Theodore M. Ley** and **Frederick A. Ley** have been made vice-presidents.

• **George P. Fisher** has been elected a vice-president of Whiting Corp., Harvey, Ill. Mr. Fisher, who will continue to act as personnel director for the organization, came to Whiting in 1917 as a converter-steel expert and for many years was in charge of the company's foundry. **A. J. Grindle** has been elected vice-president in charge of foundry equipment sales of Whiting. When the organization took over the Grindle Fuel Equipment Co. in 1921, Mr. Grindle was manager of the pulverized coal department for several years. On his return to Whiting in 1941, he joined the foundry equipment sales department, of which he was made manager in 1945. **J. Clyde Thomas,** treasurer of the company since 1944, has been elected secretary and a director to succeed **R. A. Pascoe,** resigned. Mr. Thomas has been with the company since 1918. **Stanley M. Steinko** has been re-elected controller and also elected assistant secretary. Mr. Steinko entered the employ of the company in 1922 as a stenographer.

LEE B. THOMAS, president and chief executive officer, American Elevator & Machine Co., Inc.

• **Lee B. Thomas** has been elected president and chief executive officer of the American Elevator & Machine Co., Inc., of Louisville. Mr. Thomas was connected for many years with Butler Bros. and later was president of Ekco Products Corp. **R. I. Phillips,** former president, becomes chairman of the board.

• **Charles M. Hogan** has been named resident patent counsel in charge of radio and electronic patents of the Crosley Div., Avco Mfg. Corp., Cincinnati. Mr. Hogan is replacing **Robert L. Spencer,** who will join Alden D. Redfield, former Crosley patent counsel who now heads the patent department of the Avco Mfg. Corp. in Detroit. Mr. Spencer has been patent counsel for Crosley for the past year.

• **Claude E. Davis** has been appointed field engineer in the midwest for Goodyear Tire & Rubber Co. His headquarters will be in St. Louis. Mr. Davis joined Goodyear's mechanical goods division in 1943.

• **Jack Lo Prete,** formerly chief chemist and plant metallurgist of the Wolverine Div., Calumet & Hecla Copper Co., has become president of the Spray-Coat Engineers, Inc., Detroit.

• **Dr. C. H. Samans** has been named chief of the metallurgical section of American Optical Co.'s research laboratory, Southbridge, Mass., succeeding **W. J. Wrighton,** who has retired after 27 years of service as chief metallurgist. Dr. Samans joined American Optical Co.'s research laboratory in 1941 as research metallurgist.

• **H. W. Lingenfelter,** for 23 years a lighting engineer with the Westinghouse Electric Corp., has been appointed manager of commercial, industrial and floodlighting sales for the lighting division in Cleveland.

• **W. V. Merrihue** has been appointed manager of community and employee relations for the General Electric Co.'s apparatus department, Schenectady. He will be in charge of policy pertaining to community and employee relations for the department. He relinquishes his post as manager of the advertising and sales promotion divisions, apparatus department. **J. S. Smith** has been named to Mr. Merrihue's former position. Mr. Smith had been manager of the visual education division of the advertising and sales promotion divisions prior to his latest appointment.

RICHARD Y. MOSS, sales manager, machine tool division, Sheffield Corp.

• **Richard Y. Moss** has been appointed sales manager of the machine tool division of the Sheffield Corp., Dayton. Mr. Moss joined the Sheffield organization several years ago as production engineering manager and later was transferred to an executive post in the sales division.

• **Harry W. Knoll** has been elected president of H. B. Rouse & Co., Chicago.

• **J. H. Smith,** former assistant sales manager of General Cable Co., New York, has joined General Electric X-Ray Corp., Chicago and Milwaukee, as assistant to president J. H. Clough.

• **L. L. Warriner,** president of the Master Electric Co., Dayton, and **F. Eberstadt** of F. Eberstadt & Co., New York, have been elected directors of the Monarch Machine Tool Co., Sidney, Ohio.

• **Edward W. Hill** has been appointed general manager of the industrial division of Loftus Engineering Corp., Pittsburgh. Prior to joining Loftus, Mr. Hill was vice-president of La Consolidada, Mexico, and was the assistant project manager for the steel division of Corporacion De Fomento de la Produccion at New York. He also was employed by Carnegie-Illinois Steel Corp., and was for a short period instructor at Carnegie Institute of Technology.

• **Fred F. Loock,** formerly vice-president and general manager, has been elected president of the Allen - Bradley Co., Milwaukee. **Harry L. Bradley** has been named chairman of the board, in which capacity he will continue to be active in the corporate direction of the company.

...OBITUARY...

• **Clinton R. Wyckoff,** 72, president and treasurer of the Atlas Steel Casting Co., Buffalo, and one of the company's founders 36 years ago, died Aug. 16.

• **James A. Richie,** 69, vice-president, secretary-treasurer and director of the Republic Light, Heat & Power Co., Inc., Buffalo, died Aug. 18. Mr. Richie was treasurer and a director of the Natural Gas & Petroleum Assn. of Canada.

• **Eugene H. Haug,** 53, consulting engineer for the Modern Control Co., Glencoe, Ill., and former engineer for the Wisconsin Bridge & Iron Co., Milwaukee, died Aug. 16.

• **Herbert B. Kendal** died recently. He was president of the H. B. Kendal Co. of Detroit and for 35 years had represented the Vlacek Tool Co. of Cleveland in the Detroit area.

• **Percy Jenkins,** an executive of the Wickwire Spencer Steel Div. of the Colorado Fuel & Iron Corp., New York, died recently.

• **Mark A. Hammond,** 60, sales engineer for the Electric Boat Co., New York, died Aug. 19. He had been with the company since 1942.

• **John Hazelton,** 74, formerly a salesman for H. Boker Co., New York, died recently.

• **Robert M. Little,** 69, who for more than 20 years was associated with Fretz-Moon Tube Co., Inc., Butler, Pa., died Aug. 18 after an extended illness.

• **Herman G. Ernst,** 63, one of the founders of the C. F. Ernst Sons Co., Buffalo, died Aug. 18.

• **William H. Weimer,** 55, president and general manager of the Davis & Thompson Co., Milwaukee, died Aug. 16. He had been associated with the firm since its organization in 1928 and was elected head of the concern in 1943.

• **Fred P. Underwood,** 62, vice-president and secretary of Vanadium-Alloys Steel Co., Latrobe, Pa., died Aug. 8. Mr. Underwood joined Vanadium-Alloys in 1915.

• **O. C. Lemke,** 76, president of the Marathon Foundry & Machine Co. and the Underwood Veneer Co., both at Wausau, Wis., died Aug. 17.

• **Powell Pardee,** 64, special representative in the New York district sales office of the Inland Steel Co. of Chicago, died Aug. 9. He had been with Inland since 1905.

MOTOR MANUFACTURER
Normalizes 3 Times More
GRAY IRON CASTINGS!

. . . With ⅓ The Furnace Equipment

. . . In 45% Less Floor Space

. . . At 16% Saving in Fuel

WHO? Wisconsin Motors Corporation

WHERE? Milwaukee, Wisconsin

WHEN? From September 1945 to present

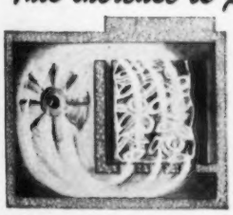
WHAT? (1) Stepped-up daily heat treating production from 13,000 pounds of gray iron castings and forgings to over 40,000 pounds.

(2) Used 45% *less* floor space,—780 square feet as compared to 1400 square feet. (Including loading space for both furnaces.)

HOW? By replacing 6 conventional box type furnaces with two Lindberg Super Cyclone pit type furnaces.

With two Super Cyclones, production zoomed from 12,912 pounds to 40,803 pounds for each 24 hour period.

This increase is possible because:



Castings reach heat quicker, heating cycle is reduced from 6 to 2½ hours. Faster, more accurate heating is possible thru using 100% Forced Convection Heating. The powerful Super Cyclone blower fan forces accurately heated air thru every part of the charge. All parts heat at the same time. No lag. No overheating of outside and underheating of middle.

Super Cyclones are never tied-up while castings cool in the work chamber. Basket handling permits castings to be *removed* from the furnace for cooling. Thus the Super Cyclone can *immediately* go to work on another charge of castings. This time saving was not possible with the conventional box type furnaces which were tied-up for hours while the work cooled *in* the work chamber.

Castings are handled more easily by using work baskets that are loaded and unloaded *away* from the furnace. With the conventional box type furnace, castings had to be tediously loaded and unloaded in and out of the horizontal work chamber.

The Super Cyclone in addition to heating quicker, permitting easier loading and unloading of work, and permitting cooling of castings away from the furnace, also operates at a 16% saving in fuel.

Perhaps there's an application for a Super Cyclone in your foundry. Bulletin 130, "Lindberg Super Cyclone" is yours for the asking. Lindberg Engineering Company, 2452 West Hubbard Street, Chicago 12, Illinois.

LINDBERG FURNACES

Industrial News Summary...

- ***Steel Production Problems Ahead***
- ***Output Fails to Exceed 93.5 Pct***
- ***New Equipment Expected in 1948***

THE steel industry this week bore earmarks of wartime days. Demand was on the increase but raw materials for steelmaking were tighter than ever. Further plaguing the steel companies was a cycle of repairs to overworked equipment which might, before it was completed, add more weeks to already deferred deliveries.

The bad effects of the coal strike, the scrap shortage and the hot weather took such a toll in the past few months that most steel firms were somewhat behind on promised deliveries. Carryovers (unshipped tonnage carried over into the next month) were increasing with every major producer. Some firms were as much as 8 to 12 weeks behind original promises.

New equipment which was to have been installed this year to alleviate the flat-rolled steel situation is running as much as 18 months behind promises made to steelmakers at the time orders were placed. It now looks like major flat-rolled equipment now on order will not be installed much before the middle of next year. Present rolling mill facilities are being pushed to the hilt but steel consumers are still complaining about the steel shortage and are shutting down in some instances until banks of stock are built upon.

There are some in the steel trade who believe that auto makers and other large steel users have placed their operating schedules on so high a plane that periodic shutdowns are bound to occur. It is believed that this is the reason why all steel consumers are not able to obtain as much steel as they claim they need to fully operate their plants. It is known that many steel fabricators and processors are operating at a much higher rate than a year ago and are still clamoring for more steel.

The breakneck pace that the steel industry set during wartime days is at last catching up with the mills. Serious major repair programs must take place immediately if equipment is to be restored to a more efficient condition. Unfortunately for steel companies and their customers many of the necessary repairs must be made to blast furnaces. A few firms find that as many as three or more stacks must be taken care of as soon as possible. In the past few months pig iron output has been somewhat below actual requirements. This has been one of the reasons why steel companies have been unable to continually keep ingot output at peak levels.

THERE is no danger that steel production will slip sharply but demand is so strong that even a three or four point decline will be enough to force a complete revamping of present steel quotas. One large company expects to end up this year somewhat behind on promised sheet deliveries. As a result it may be necessary for this and other firms to cut down on quotas for this product in the first quarter of 1948.

Despite the Labor Day which is classed as a regular holiday in union contracts steel output remained unchanged this week at 93.5 pct of capacity. Mills paid premium time to keep continuous operations going. It is expected that every effort will be made to keep raw steel output at current levels.

There was no significant change in the scrap markets last week except a dip at Buffalo. This was in line with changes made at other locations a week or so ago. Most steel officials are still anxiously watching the trend in scrap prices but there was no evidence this week of any sharp drop in quotations in the near future. On the other hand fear of a runaway market has subsided somewhat in the past week. The entry of several buyers into the market has had little effect in prices. But there are still some who believe that the price of scrap will not show any marked drop as long as conversion deals are still large in number and as long as the outlook for heavy steel output continues.

On the price front there was evidence last week that in some areas the dual price setup on semifinished steel had been eliminated. In Cleveland competition among some of the larger firms has wiped out the higher prices on billets blooms and slabs posted by some companies. Whether this action will spread to other districts remains to be seen but the trend is that way. The price differences between certain flat-rolled items was still effective this week.

THERE was no indication that stainless steel makers would, for the time being at least, raise prices. There are still some who believe that an increase is in prospect but others see no boost. Warehouse interests are expected to steal a march on steel firms by absorbing most if not all of the recent advance in alloy steel product prices. They hope to bring volume of sales up enough to compensate for this action. Just what reaction this will have on steel companies remains to be seen.

Reaction in steel areas to the Federal Trade Commission complaint on the basing point system has died down. It is agreed that it will be a long drawn out battle and will eventually reach the Supreme Court. By now most steel users have realized what an upheaval would occur if a straight f.o.b. mill system were to be invoked.

• **LANDS PIPE ORDER**—The A. O. Smith Corp., Milwaukee, has secured a $36,720,000 contract to fabricate 272,000 tons of steel pipe for the Michigan Consolidated Co. to be used in building a 26 in. natural gas line from Detroit to the Austin gas field near Big Rapids, Mich.

• **VETERAN'S RIGHTS**—Reenlistment in the armed forces within 90 days after discharge does not affect a veteran's right to the job he held prior to his original period of service, the Labor Dept. ruled last week. The determining factor is whether the continuity of the veteran's reemployment right remains unbroken. It is the opinion that inasmuch as the veteran has a right to restoration to his former position which is in existence during the period of his military service and 90 days thereafter, this right can be defeated only if the veteran permits the 90 day period to expire without having applied for restoration. A reenlistment prior to the expiration of this period provides such a continuity of his right to restoration as to entitle him to exercise such right after the completion of his reenlistment.

• **BLAST FURNACE CONSTRUCTION** — Ashmore, Benson, Pease and Co., of Stockton-on-Tees, Britain, has under construction a blast furnace rated at 1,000 tons a day. It is the first of two to be built for the new Steel Company of Wales and will supply pig-iron to the steel-making plant to be erected at Margam, as a part of the British tinplate expansion program.

• **LAYOFFS REMAIN LOW** — Hiring of additional workers in iron and steel industries in June aided in reversing a downward May employment trend evident in durable goods industry groups, the Bureau of Labor Statistics reports. Layoffs continued at a low level in June as an improved flow of materials raised the accession rate in iron and steel fabricating fields. Increased supplies of steel and parts for the automobile industry brought layoffs down sharply and previously laid off workers were called back to work. Separations in the aircraft industry continued to exceed hiring.

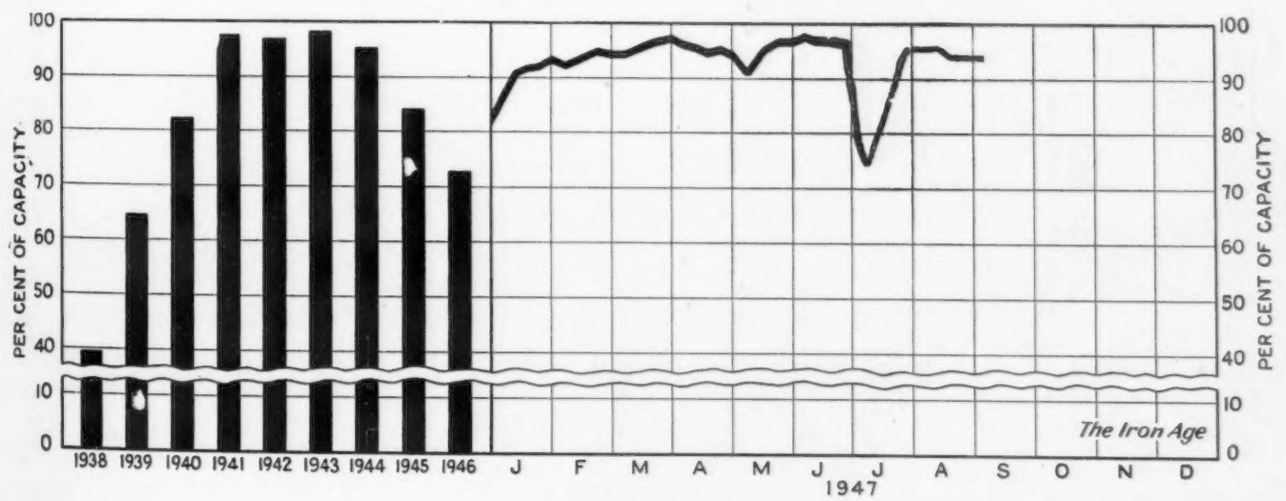
• **NEW ORE RECORD**—The Great Lakes fleet in July set a new high record for a month with the movement of 12,613,820 gross tons of iron ore, according to announcement by the Lake Carriers Assn. Nearest comparable ore movement was 11,496,303 gross tons in August, 1941, when the association's vice-president, G. S. Wellman, emphasized "the accelerated movement for national defense was at its peak," while this is peacetime. The recent 10-day vacation of coal miners is strongly reflected in the Lake Carriers' figures on westbound coal movement. The movement of coal cargo in July fell lower than any time since 1935. The July tonnage was 4,446,710 tons compared with the record peacetime month of August 1946, when 8,177,805 tons were carried.

• **BUILDS COKE OVEN**—Weirton Steel Co. has put a new battery of 53 Koppers byproduct coke ovens into operation, increasing the coke output by 850 tons a day. Within 2 months, another battery of similar capacity will be in use. Under construction since April, 1940, the new batteries will give Weirton Steel a total of 262 byproduct coke ovens with a capacity of 3400 tons per day.

• **CANADIAN CAR OUTPUT**—Factory shipments of Canadian motor vehicles in May totalled 21,665 units, compared with 21,891 units in April and 20,022 in May 1946. Of shipments in May, 12,900 were passenger cars, of which 2838 were for export. Shipment of trucks in May totalled 8706 of which 5246 were for sale in Canada and 3460 for the export market. There were 59 buses shipped, of which 49 were for sale in Canada and 10 for export. In the first five months of this year the Canadian automotive industry shipped 105,078 units, which compares with 64,204 units in the like period of 1946.

• **GEAR SALES**—The Gearing Industry, as represented by the members of the American Gear Manufacturers Assn., shows an increase in volume of sales for July 1947. as compared with June 1947, of 5.25 pct. This report does not include turbine or propulsion gearing. The index figure for July 1947 was 361.

Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
August 26.....	99.5	90.5	88.5	94.0	98.0	102.0	100.0	99.0	102.5*	109.0	96.0	82.0	95.5	93.5
September 2....	100.5	92.0	88.0	94.0	97.0	102.0	100.0	97.0	100.5	103.0	96.0	82.0	95.5	93.5

*Revised.

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Maritime Commission Loses 2 Million Tons of Ship Plates

Now Demands Hundred Million Dollar Refund From Firms Which Overshipped

o o o

By GENE HARDY
Washington Editor

o o o

Washington

• • • **Additional headaches to** the tune of possibly $100,000,000 in refund requests from the Maritime Commission are in store for the nation's leading steel producers as a result of the Commission's investigation into alleged overcharges on wartime shipments of steel plate totaling somewhere between 20,000,000 and 22,000,000 tons.

Maritime investigators who have been working on the problem since 1945 and began "putting the heat on" in January of this year, claim that the industry billed them for and received payment for approximately 22,000,000 tons of plate, in contrast to the approximately 20,000,000 tons ordered for merchant ship construction during the period 1941-45.

Heading the investigation, first revealed in THE IRON AGE, June 26, p 39, are Frank L. Lynch, Chief of the Accounts Division, and H. P. Strople, Chief of the Contracts Section. These men have been meeting with steel company officials for several months and still are far from solving the mystery of the 2,000,000 additional tons. However, they have several good ideas as to how this situation came about.

Messrs. Lynch and Strople recently created quite a stir during their visit to Jones & Laughlin in Pittsburgh. It has been erroneously reported that Jones & Laughlin was the leading figure in regard to the alleged overcharges. Nothing could be farther from the truth. Mr. Strople told THE IRON AGE that "our visit to Jones & Laughlin was our first field trip on this matter and others will probably follow. All companies shipping plate under Maritime orders during the period involved are being studied. These include: Bethlehem Steel Co., Granite City Steel Co., Great Lakes Steel Corp., Inland Steel Co., Jones & Laughlin Steel Corp., Republic Steel Corp., United States Steel Corp., Wheeling Steel Corp., Youngstown Sheet & Tube Co. We have already had talks with officials from most of these companies."

There is little doubt in the minds of the Commission concerning the alleged overcharges and overweight shipments. The primary objective is to prove that this is the case, or rather to have the steel industry prove that the 22,000,000 tons claimed to have been delivered actually was shipped.

Maritime is backed up in this investigation by the General Accounting Office, which got into the picture after Messrs. Lynch and Strople began their investigation. GAO, in making a secondary audit, discovered errors on the side of overpayment by the Government and has so informed Maritime.

Other government agencies also are interested. The Federal Trade Commission is watching for developments that might lead to a complaint on the grounds that the alleged overcharges were the result of an agreement on identical practices. The case might also result in proving that OPA regulations had been violated. Finally, success on the part of the Maritime Commission might result in similar claims being made by a whole host of purchasers of other products. "In any case," Mr. Lynch told THE IRON AGE, "the data we have uncovered thus far are sufficient to warrant our going ahead with the investigation."

Actually, Maritime believes the difficulty has been caused by the adoption of a formula policy on the part of the steel companies. Allegedly, the steel companies used a formula, to their own advantage, in calculating the the-

Needle In the Haystack

oretical weight of what was to be shipped regardless of the actual weight of the shipments. It should be made clear, however, that Maritime is willing to accept standard manufacturing practices as to variations, if it can be proven that this would account for the 2,000,000-ton discrepancy.

The issues surrounding the case, which might mean claims against the steel companies running into many millions of dollars, are quite complicated and some historical background is necessary for a full understanding of the issues involved.

Early in the defense period, Maritime began ordering plate in terms of weight per sq ft rather than edge thickness. In addition, the trend toward prefabrication of ship assemblies brought about the practice of submitting to the plants mill sheets defining the theoretical weight of any given piece of plate.

Maritime does not claim that all the pieces ordered were not delivered. In fact, the exact opposite is true, as indicated by maritime statements that it has been billed and has paid for the rolling and transportation of about 22,000,000 tons, or approximately 2,000,000 tons more than were ordered. The big problem is to account for the missing 2,000,000 tons.

Maritime claims that early in 1943 it first realized it was being billed for more than was ordered and it also realized that the additional weight was above normal variation, which should not have been more than 5 pct. The exigencies of war prevented any action from being taken at that time.

It would appear then that the matter could be settled rather simply by checking the weights of the shipments involved. However, this is easier said than done, according to Maritime.

During the war years, all Maritime orders were shipped on Government bills of lading in order to classify material as military shipments. Maritime took title to the material and the weights at the mills. This was accepted as prima facie evidence of correct weight and it was also believed that a second point of verification would be found in the carriers' records. The carriers, in most cases, accepted the shippers' weights and count and cannot provide Maritime with sufficient data to prove their case. The carriers also might be faced with claims for refunds if it is found that shipments do not side with the tonnage paid for by Maritime.

Maritime further claims that all plate for the first 500 ships was shipped according to specified orders, but that when requirements zoomed and the Government undertook to allocate plate in 1942, the yards began to receive alleged overweight shipments from some 14 mills which had converted to unsheared plate.

Sheared versus unsheared plate also plays a large part in the whole picture. Under the strain of war, Maritime was forced to accept unsheared plate in instances where tonnage was rolled faster than it could be stacked, cooled, and sheared.

This acceptance of unsheared plate led Maritime to believe that a considerable portion of the extra 2,000,000 tons might be accounted for in the scrap resulting from the shearing of the unsheared plate. Scrap sales by shipyards did not account for anywhere near the 10 pct difference, according to Mr. Strople.

Nor was Maritime able to find a standard set of tolerances and variations for unsheared plate, it is claimed.

Weighing the plate is the crux of the whole problem. Few shipyards had weighing facilities. Therefore, yard records, except for scrap sales, are of little value. Maritime found that verification of the weights was a huge task. The carriers did not know, nor did the various Weighing and Inspection Bureaus, says Mr. Strople.

Accordingly, the steel companies were asked to produce their records. It was found that several mills did weigh their plate and proved to the satisfaction of Maritime that they charged only for the authorized amounts, with the only excess being the scrap from unsheared plate. In this connection, one major producer practically has been given a clean bill of health.

The situation in regard to most mills, however, is still rather confused. If these companies cannot prove that they shipped the actual weights for which they later billed the Government, Maritime will probably decide that the companies are entitled only to the average industrial variation claiming a return to the Government of the difference involved. If the companies actually weighed the material and can verify it, they probably will wind up in the clear.

Questions Brought to Mind

New York

• • • The Maritime Commission story on the missing two million tons of plates brought forth the following questions from an industry executive:

1. **If the excess plates were not ordered, why were the invoices approved?**
2. **If the plates were paid for and shipped, where are they?**
3. **If the plates were never shipped, why were the invoices approved for payment without either orders or shipping notices?**
4. **If 2 million tons of ship plates are mislaid on rail sidings somewhere, does this account for the freight car shortage?**

Reports on Iron Valves

Washington

• • • Printed copies of Simplified Practice Recommendation R184-47, Iron Valves, are now available, according to an announcement by the Commodity Standards Div. of the National Bureau of Standards.

The recommendation, first issued in 1942, applies to the usual types of iron gate, globe, angle and check valves for primary pressures of 25, 125, 150 and 250-lb steam service, and 100 and 800 psi for water, oil and gas. A simplified range of sizes is given for the various types and kinds of valves for each of the pressure ratings.

WAA Offering Sites

Washington

• • • Bids on one or more of 14 areas capable of industrialization at the Wainwright Shipyard, Panama City, Fla., will be received until 9 a.m., Sept. 18, War Assets Administration has announced.

The 14 areas range in size from 1 to 42 acres and are close to raw materials, short-line transportation facilities and Gulf ports. WAA believes the areas are suitable for development of furniture, plywood products, boxes, or containers.

Steel Mills Face Scrap Shortage During Coming Winter Months

Lack of Aggressive Government Action Said to Be a Big Contributing Factor

New York

• • • **Steel companies face** a shortage of scrap this coming winter according to surveys of current receipts and stocks now on hand. If the winter is severe such a shortage could easily force a drop in steel production with serious effects on the national economy. These effects, according to informed observers, might be reflected not only in dislocation of finished steel shipments but in soaring scrap prices with their consequent threat to steel prices.

Though few scrap dealers and consumers have come out recently to point an accusing finger at the federal government, many privately admit that the fault is partly Washington's and that only energetic action from that source can avoid what promises to be a serious situation.

Admittedly, the war caused tremendous scrap losses but reliable sources say lack of intelligent War or Navy Dept. direction of scrap recovery immediately after the war is a major factor. Even during the war, London sources report, the British army had a well organized scrap recovery procedure and their army scrap recovery teams were active in every theater.

Following the war this British army-collected scrap was used as a lever to keep domestic prices down. Having adequately tied up all scrap supplies in their own zone of Germany the British are now attempting to so stack the cards so that they will also get some scrap from the American zone as a result of the merger of the two zones. A reliable observer, recently returned from a tour of the two zones, believes the British have at least a 50-50 chance of accomplishing this unless American scrap recovery policy is given some direction and vigor.

In contrast to this aggressive collection policy, U. S. Army Ordnance officer say that, beyond stacking some parts and cutting up a few others there was only a small effort made to salvage scrap iron, steel and metals, in U. S. theaters of operations. At their peak, shipments of scrap from the European Theater were only about 10,000 tons a month. The fault, these officers indicate, was not in carelessness in the field but was due to lack of planning from above.

That the scrap loss is serious can be seen by reviewing the picture over the past two decades. According to Robert W. Wolcott, chairman of the Steel, Foundry & Scrap Industries' Committee for Expediting Iron & Steel Scrap, some 20 million tons of scrap was exported from this country from 1930 to 1940. "During the war emergency, from 1940 to VJ-Day, it is estimated that fully 140 million tons of scrap or potential scrap was irretrievably lost in combat and through the disposal abroad of surplus military equipment," Mr. Wolcott added.

Subcommittees of the above named group have been investigating idle scrap in this country. On the West Coast alone, members of the committee and War Assets Administration representatives recently estimated that there were 350,000 tons of material suitable only for scrapping. (THE IRON AGE, Aug. 21, p. 94.) At the time the investigations were made, in July, it was estimated that only 1 pct of this material was in WAA inventories.

Scrap men—buyers and sellers alike—agree that the government has been too slow in disposing of material of this sort, just as there have been numerous complaints of delays in making vessels and yards available to shipbreakers. Those questioned on the subject agree that if we are to implement the Marshall Plan by exports of steel the United States should officially and actively consider the matter of scrap recovery. Fear has been expressed in some quarters that a long severe winter might provoke a scrap scarcity that would push No. 1 heavy melting steel scrap prices up to the neighborhood of $50 a gross ton.

Britain may get from 2½ to 5 million tons of scrap from Germany during the next 5 years. (THE IRON AGE, Mar. 27, p. 110.) This, according to London sources, is essential to the British economy, cut off as it is from its normal pre-

(CONTINUED ON PAGE 135)

USING OWN SUPPLIES: *At least a small part of the war scrap left in Germany is being used by struggling German industry for remelting. These shells from ammunition dump are being turned into shoes for horses and oxen. Many more tons are being exported from the rubble, however.*

White House Predicts $2 Billion Research Expenditures Yearly

Washington

• • • **Industrial and** university research on an unprecedented scale and geared to a budget of $2 billion annually was recommended by the White House last week.

John R. Steelman, aide to President Truman and chairman of the Scientific Research Board, predicted in his first report on "Science and Public Policy" that the national income will be over $200 billion by 1957 and that the national research budget will stand at more than $2 billion annually.

About half of this sum will be provided by the Federal Government, Mr. Steelman estimates, with industry and universities making up the balance. At the present time, federal funds for research total about $625 million annually, with $200 million expended in government laboratories and the balance in industrial and university research programs.

"There is no reason to recommend any substantial change in this general pattern for the future," Mr. Steelman recommended in his report to the President. "Each of the three segments of the research triangle is especially adapted to the performance of a particular type of research and each can make a unique contribution to our total research and development effort."

Mr. Steelman finds three principal faults with the nation's research efforts at the present time. These, he says, are: (1) we are devoting too small a proportion of our total resources to basic research (2) we are devoting too small a proportion of our total research and development resources to health and medicine (3) we are devoting too small a proportion of our development resources to nonmilitary ends. Actually, he says, we ought to be spending at least four times as much on basic research and at least twice as much as at present on nonmilitary development.

The normal growth of industrial research, Mr. Steelman believes, may be expected to right the balance between military and nonmilitary development in the next 10 years. Direct federal financial aid will not be required for this purpose.

Any future revisions of corporation tax laws should take into consideration the importance of industrial research to the national welfare and security, Mr. Steelman states in his report. He adds that the most serious problems in the industrial development area arise not in terms of the volume of research but in terms of its distribution and ultimate application.

Mr. Steelman points out that not all industries are well organized for research and development. Some basic ones, like the building industry, are technologically retarded and are not organized in a manner to support a large research program. Others, like the railroads, find heavy capital investment in obsolete equipment an impediment to the application of new technology.

"Both tendencies are a threat to the continued expansion of our economy and to the maintenance of our national leadership in technology," Mr. Steelman says. "The problems which they represent are beyond the scope of this report but should receive the careful attention of the Council of Economic Advisers and other interested agencies. In the present state of the world we can afford neither immaturity nor obsolescence in important industrial sectors."

Fulfillment of this ambitious program can best be started with creation of a National Science Foundation, Mr. Steelman believes. Mr. Truman recently vetoed such legislation on the ground that the White House would not have complete control of research activities. (THE IRON AGE, Aug. 21, p. 98.)

Mr. Steelman asks that Congress write another science foundation bill which would authorize spending $50 million for basic research in the first year and increasing amounts thereafter, so that the rate would rise to $250 million annually by 1957.

"Except in the event of a military emergency, it is unlikely that the Federal Government will have to finance the necessary expansion in industrial research facilities," Mr. Steelman states, adding that "we should provide a favorable climate for such expansion through tax incentives and other established methods, without making direct grants to industry."

Russia currently is spending $1.2 billion a year for research and development as compared with her prewar outlay of $900 million in 1946, Mr. Steelman points out. The Soviets also have begun a five-year program of intensified scientific training under which they are reported to be producing 140,000 engineers and scientists each year. In Britain the Barlow Committee has recommended a program to double the annual production of scientists. Belgium recently has doubled its research and development expenditures.

Mr. Truman in urging a program for scientific development, said recently that the nation has "a vast reservoir of war-accelerated technological development which must be applied speedily and effectively to the problems of peace—stepping up productivity in both industry and agriculture, creation of new farm and factory products and advancement of medical science. Fundamental research, necessarily neglected during the war, must be resumed if scientific progress is to continue."

Weekly Earnings Drop

Washington

• • • **Steel and coal** shortages as well as summer vacations pulled the average workweek down to slightly below 40 hr in July, the Bureau of Labor Statistics estimated last week.

Although hourly earnings increased during the month from $1.22 to $1.23, the drop in weekly hours for all manufacturing industries cut average weekly earnings from $49.37 to $49.25.

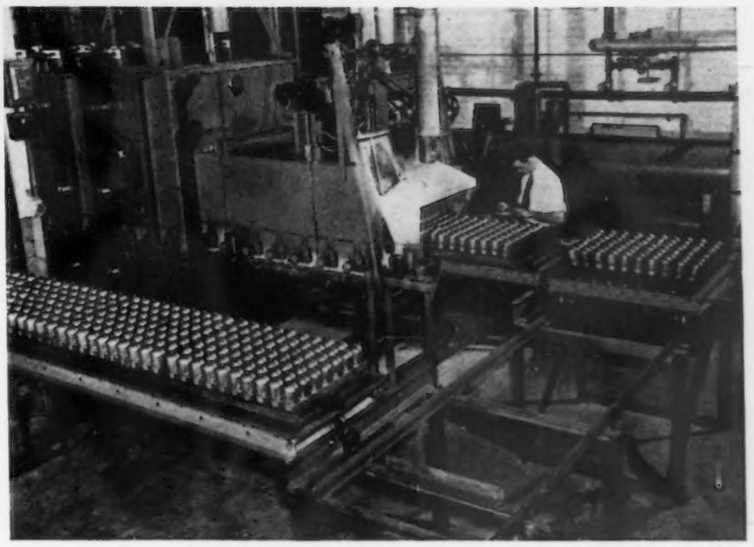
Average weekly earnings fell slightly from $52.95 to $52.41 in durable goods industries, BLS estimates, while the average hourly earnings rose from the June figure of $1.30 to $1.31 in July.

In the nondurable goods industries, average weekly earnings increased from the June figure of $45.47 to $45.89 in July. Average hourly earnings rose from $1.14 to $1.15, while the average weekly hours remained constant at 39.8.

Bombmaking—Peacetime Style

• • • The Aerasol insecticide bomb—war-famed mosquito killer for millions of troops in the tropics—has been improved by use of electric furnace brazing at the Aer-a-sol Div. of Bridgeport Brass Co. The containers, of SAE 1010 steel 0.043 to 0.049-in. thick, carry liquid insecticide at about 90 psi. Fabrication rate is about 10,000 per 8-hr shift. Originally the bombs were made by a bonding method which involved locally heating each joint and using brazing metal and flux. Now, two General Electric continuous furnaces do the job.

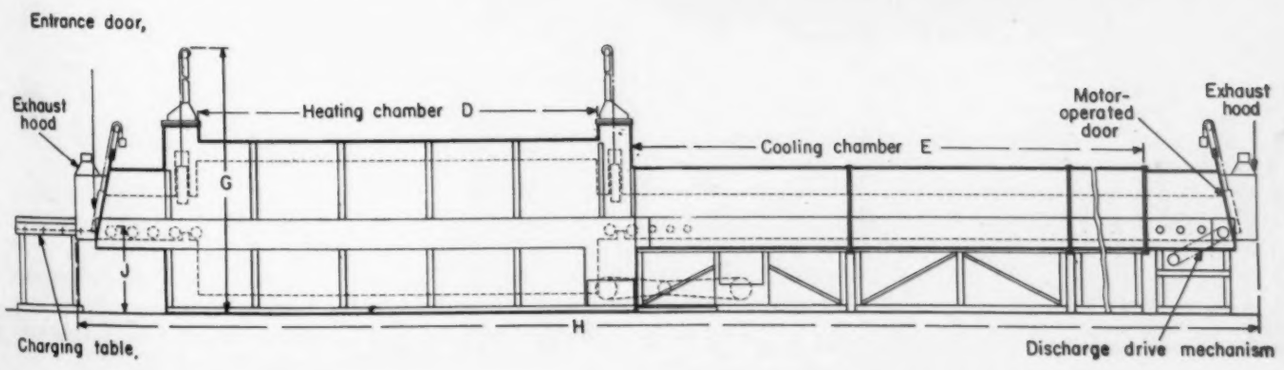
AT the loading station, left, operators preplace copper wire ring in the containers prior to brazing. Flux is of course eliminated and all four of the assembly joints will be bonded simultaneously as they go through either of the continuous furnaces.



CONTAINERS, right, ready to be charged into a furnace. In the right background is an atmosphere gas converter to supply protective furnace atmosphere. Each of the roller-hearth copper brazing furnaces has a 9-ft heating chamber and a 30-ft cooling chamber.

o o o

EACH of the GE furnaces—the layout of one is shown below—has heating units rated 180 kw, divided into 90-kw zones. For 700 containers per hr from each furnace the power consumption is about 157 kw-hr. Gas consumption is about 1500 cu ft per hr.



Shipment Jams to Plague Users of Oil, Gas and Coal This Winter

New York

• • • **Fuel will be one of** industry's nastiest problems this winter. The metalworking and metalproducing plants in the Pittsburgh and Middle Western areas will be among the hardest hit, according to the latest surveys on the supply situation in fuel oil, coal and natural gas. Because the shortages will be due primarily to lack of distribution rather than production facilities many plants are installing or planning to install standby equipment.

Some of this equipment may not prove as effective as is generally thought because if enough consumers switch to a specific substitute it too may prove inadequate. Extreme pessimism is unwarranted, however, because specialists in the various fuels are agreed that most shortages will be local and may be staggered. The standby equipment will probably prove well worth while simply because under the conditions of the anticipated shortages it will provide a reserve adequate to tide most plants over short term crises.

Survey Shows Many Plants Have Oil Standby Units in Areas Normally Using Gas

o o o

According to an engineer who has made a study of the problem for a large steel plant the situation could become serious if, for instance, the natural gas supply were to be sharply cut in the Pittsburgh district and a heavy battery of oil standby equipment were called into play.

Conceding that the Middle West has the country's most critical fuel oil supply problem, the American Petroleum Institute reports that overall requirements for the East Coast will be met this winter, "provided of course, that an abnormally cold winter is not experienced and that there is no shortage of substitute fuel."

This latter is said to be the crux of the enigma. Natural gas shortages severely cut into operations of many Pittsburgh steel mills this past winter. While new natural gas lines are under way, many companies there have been unwilling to risk a repetition of last winter's expensive shutdowns. Some have installed propane storage units, others—and their number is greater—have set up oil storage tanks and standby oil burning equipment. Those fortunate enough to have these storage tanks, many of which will hold a 20 or 30-day standby fuel oil supply are not expecting any difficulties. Those with inadequate oil storage facilities will apparently not fare too well in the face of a natural gas shortage, according to the above statement by the Petroleum Institute.

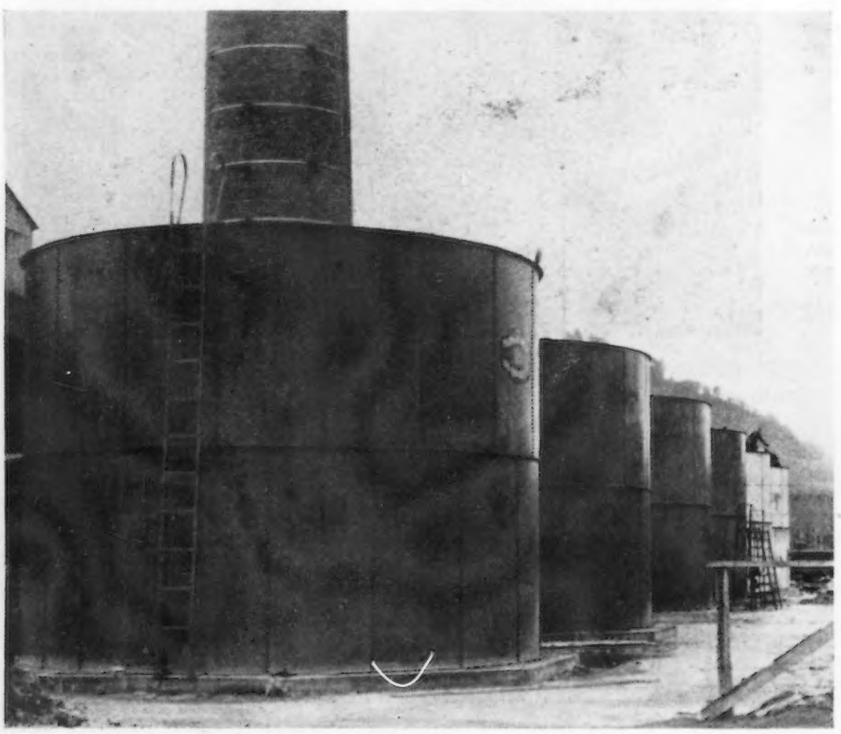
The attitude on this problem throughout the country was sampled in a survey by THE IRON AGE. Of 1350 metalworking plants reporting, 345, or 41 pct of the 836 reporting plants using gas furnaces stated that their operations had been adversely affected by periods of short gas supply. Of these 836 plants equipped with gas furnaces, some 160, or 19 pct, had standby oil units. Another 351, amounting to 42 pct, said they would consider oil standby equipment.

It should be noted that not all the users of gas furnaces questioned in this survey experienced gas shortages last winter. The shortage troubles were concentrated in Ohio, Pennsylvania, West Virginia, Indiana and Wisconsin, though other states, particularly in the Midwest were named.

In the same survey, 72 out of the 97 steel mills reporting (all of which had gas furnaces) were affected by shortages of gas. Just about half of these plants already have standby oil equipment.

Most of the larger steel companies not only have standby equipment but they also have storage space for the fuel to fire it. Those companies which use oil and can't store a good percentage of their requirements are dependent on the adequacy of transportation. Oil men expect a sharp increase in demand for heavy fuel oil this winter along the East Coast, including furnace heating oil and the bunker C oil used in openhearths. Informed sources agree that there will indeed be a shortage of these heavier fuels unless there is an increase in imports and an improve-

HOW TO BEAT IT: *National Supply Co.'s Spang-Chalfant Div. pipe mill at Etna, Pa., was shut down completely for 32 full days of 24 hr each during the natural gas shortage last winter. This year the story will be different because these six oil storage tanks have been built and filled with 270,000 gal of fuel oil.*



ment in shipments from Gulf Coast ports.

Some companies replying to the survey questionnaire said not all their gas furnaces could be equipped for temporary oil operations due to the type of furnace, the atmosphere required or the class of work processed. Many that have such equipment now do not have it throughout the plant. A steel mill reported it had standby equipment on its soaking pits and heating furnaces, but not on its annealing or heat-treating furnaces. The object is apparently to have enough heating equipment to maintain basic operations.

One manufacturer asked, "What assurance would there be that there would not be a shortage of fuel oil if a large number of industrial gas users were to switch to oil in a short time?" The answer—based on the latest information—appears to be that if most of these manufacturers had only small storage tanks that would need refilling in a few days there would be no assurance that an oil famine wouldn't replace the gas famine. The larger plants are observed to be guarding against this by installing ample oil storage tanks—when they can get the steel.

Conversely, the Midwestern oil shortage has led several companies to consider installing standby gas furnaces.

Shortages of tank cars and storage equipment will be responsible for most of the headaches this winter, according to the American Petroleum Institute. The industry is now refining more than 5,100,000 bbl of crude oil per day, compared to the average of the peak wartime year 1945 of 4,711,000 bbl per day, and to the prewar average of 3,861,000 bbl per day in 1941. Only by keeping fuel oil tanks filled can the manufacturer in the Midwest hope to alleviate his problem during the coming winter.

The recent embargo on Canadian shipments highlighted the acute shortage of coal cars on American railroads. The shortage appeared even more alarming when it was disclosed that one of the country's largest railroad systems had only a 4-day stock of coal on hand. This shortage was ascribed to lack of cars, not to insufficient coal production. However, anthracite production is said by the Anthracite Institute to be approximately 8 pct less in the coal year which started April 1, 1947 than it was in the corresponding 1946 period.

About 30,000 coal cars were loaded with products other than coal during the coal mine vacation period and many are not yet back in coal service. Canada is still believed to have about 10,000 more American coal cars than it normally has. If the car shortage continues at its present rate some well informed sources predict further shutdowns in the soft coal mines. Reports from Pennsylvania and West Virginia say some mines are closing for 2 to 3 days a week because coal is piling up on the ground faster than it can be hauled away.

Searches for standby equipment to replace natural gas have received more attention from heavy industry because of the extent to which so many operations such as steelmaking depend upon it. Liquefied petroleum gas (propane and butane) still rates high on the list of substitutes because unlike fuel oil it is quite readily adaptable in many systems with little or no change. Some shops report that furnace operators are unable to tell when natural gas supply is cut off and the standby propane unit is cut in.

In 1946 the sales of liquefied petroleum gas were estimated by the Petroleum Institute at 1.4 billion gal, an increase of almost 30 pct over the 1.1 billion gal sold in 1945. The fantastic rise of this commodity can be seen by a look at the 1941 sales figure—less than half a million gallons.

Another substitute for natural gas is a unit made by Gas Machinery Co., that generates 1000-btu gas from fuel oil. Several of these units have been installed, one of the main reasons probably being that the relatively small unit replaces one form of gas with another to minimize conversion problems.

15-Year Lease Signed

Washington

• • • **Crucible Steel** Castings Co. has signed a 15-year lease, through its trustee, on a $2 million surplus Government plant at Milwaukee, War Assets Administration announced last week.

The lease, signed by Albert B. Houghton, trustee under voluntary bankruptcy proceedings, calls for a minimum rental of $48,000 per year and contains a schedule of production rents based on percentage of sales. Crucible has the option to buy the facilities for $1,200,000 at any time within 14 years.

An independent operation foundry, capable of producing 8,000 to 9,000 tons of light and medium steel castings per year, is included in the property.

Blast Furnace Capacity and Production—Net Tons

	Number of Companies	Annual Blast Furnace Capacity	PRODUCTION							
			PIG IRON		FERRO-MANGANESE AND SPIEGEL		TOTAL			
									Pct of Capacity	
			July	Year to Date	July	Year to Date	July	Year to Date	July	Year to Date
DISTRIBUTION BY DISTRICTS:										
Eastern	11	12,551,280	851,872	6,282,073	22,509	175,069	874,381	6,457,142	82.2	88.6
Pittsburgh-Youngstown	17	25,042,040	1,729,160	13,250,389	18,360	106,364	1,747,520	13,356,753	82.3	91.8
Cleveland-Detroit	6	6,557,500	424,550	3,434,766	.....	.....	424,550	3,434,766	76.4	90.2
Chicago	7	14,097,710	1,033,846	7,217,276	.....	.....	1,033,846	7,217,276	86.5	88.1
Southern	8	4,924,670	315,041	2,262,269	12,126	66,335	327,167	2,328,604	78.4	81.4
Western	4	2,536,000	177,150	1,264,579	.....	11,297	177,150	1,275,876	82.4	85.6
Total	37	65,709,200	4,531,619	33,711,352	52,995	359,065	4,584,614	34,070,417	82.3	89.3

Source: American Iron & Steel Institute

Steel Syndicate Is Buying Ingot Plant To Supply Its Members

Chicago

A. H. Maremont

• • • **A syndicate of** twenty-five manufacturers throughout the country has purchased an ingot-producing steel mill at Phoenixville, Pa., for approximately $4,000,000. Arnold H. Maremont is the group's president, who originated the idea and organized the syndicate. Maremont is executive vice-president of Maremont Automotive Products, Inc., Chicago.

The purchase was made in order to supply ingots for a sheet mill at Apollo, Pa., which the syndicate bought when it was organized last December. The new acquisition completes a program for meeting the manufacturers' steel needs.

The mill, with a capacity of 30,000 tons of ingots a month, is the Phoenix Iron Co., purchased by the Phoenix-Apollo Steel Co. Maremont said the mill will begin operation under the new owners September 15.

The mill, which contains six open hearth furnaces and three rolling mills, will provide enough steel to enable all manufacturers in the group to operate at full capacity while all excess steel will be sold to other consumers, Maremont said.

Sheet bars from the Phoenixville mill will be rolled into sheet steel at the Apollo mill, formerly the Apollo Steel Co. Both mills have a total appraised value of $11,000,000.

The management of the Phoenixville mill will be retained. David Thomson, president of the Phoenix Iron Co., will serve as general manager under the new ownership. Howard Keiser, formerly of the Portsmouth division of the Wheeling Steel Co., is manager of the Apollo mill.

•

Cleveland

• • • **Purchase of the** Phoenix Iron Co. to supply semi-finished steel to the former Apollo Steel Co. sheet mill now owned by a group of some 25 steel consumers is the latest development in the present trend of steel consumers to acquire plants producing finished and semi-finished steel in order to assure a dependable source of supply in the present market. Acquisition of Apollo last November by the consuming group did not wholly solve their problem of steel supply, as there was no assurance of a continuing supply of semi-finished steel.

According to reliable sources, the purchase includes Phoenix Bridge Co., a subsidiary, but does not include Lake City Malleable Co., Cleveland, or Virginia Metal Products Co. These companies will continue under combined management independent of the newly organized Phoenix-Apollo Steel Co. David Thomson, president of Phoenix Iron Co., who will become general manager of the newly integrated steel producer, retains an important financial interest in these companies.

It is understood that the purchase involves land, plant and inventory only. Also the buying syndicate does not contemplate the issuance of stock to cover the cost of the new plant.

The steel consumers comprising the syndicate include Eastern, Mid-West and West Coast manufacturers. Freight costs to their plants may be expected in some instances to build up the delivered cost of steel above that of steel from the open market. However, market observers point out that in most instances the cost of steel to these companies is a minor factor in their overall costs. In the present steel market, the availability of continuing supplies of steel is important to permit their plants to continue in production.

Last November, General Electric Co. purchased the Mahoning Valley Steel Co. in order to obtain a source of supply for hot-rolled sheets. Borg Warner Corp. about the same time purchased Superior Sheet Steel Corp., Canton, Ohio, to assure a supply of sheet steel. The International Detrola Corp. purchased Andrews Steel Co., and its subsidiaries, a year ago for the same purpose.

AAA Plans to Be Made

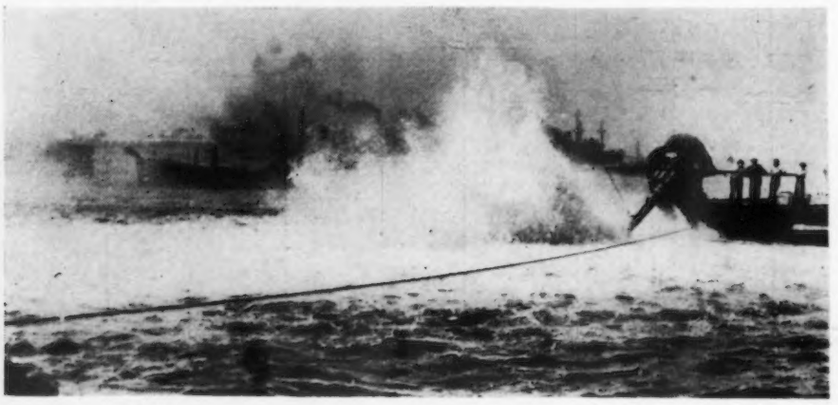
Chicago

• • • **Detailed plans for** technical sessions to be sponsored by the steel division of American Foundrymen's Association at the 1948 convention in Philadelphia May 3-7 will be drawn up at a meeting of the division program and papers committee in AFA headquarters, Chicago, September 15.

Charles Locke, chief metallurgist of West Michigan Steel Foundry Co., Muskegon, division vice chairman and head of the program and papers group, will preside.

Other members of the committee are H. H. Blosjo, metallurgist with Minneapolis Electric Steel Castings Co.; J. A. Duma, metallurgist at the Norfolk Naval Shipyard, Portsmouth, Va.; J. A. Rassenfoss, research metallurgist, American Steel Foundries, East Chicago, Ind.; E. C. Troy, vice president in charge of research and development, Dodge Steel Co., Philadelphia, and G. Vennerholm, metallurgist with Ford Motor Co., Dearborn, Mich.

JET TURBINE WORKHORSE: *Not content with speeding airplanes, and snow removal work in winter, British authorities are now trying out their powerful jet engines for mud dredging operations in the River Thames.*



Weekly Gallup Polls . . .

More Information on Foreign Policy Wanted by Public

Princeton, N. J.

• • • **About one fourth** of the nation's voters want the government to give out more specific information concerning foreign policy, according to George Gallup, director, American Institute of Public Opinion.

Another one fourth believe the government is holding back vital information, but that there are probably good reasons why Washington cannot give out more.

The remaining one half of the voters are either satisfied that the government is telling enough about international policy or have no opinion.

A cross-section of voters was asked in a coast-to-coast poll:

"Do you think our government is giving the people all the important facts about world conditions today or do you think the government is holding back on a lot of important information which the people ought to have?"

The results show that 18 pct think the government is giving out enough, while 59 pct think it is holding back, and 23 pct have no opinion.

Voters who said that the government is holding back information were then asked: "Is there anything in particular on which you would like to have more information?"

Only 26 pct, or less than half, mentioned anything specific. Their chief concerns were:

	Pct
(1) Russia, relations with Russia	8
(2) General world conditions, chances of war	4
(3) U. S. foreign policy, Marshall Plan	2
(4) Atomic energy and bomb	1
(5) Roosevelt-Stalin-Churchill talks	1
(6) Relief shipments abroad	1
(7) Miscellaneous	9
(8) No subject named	1
	*27

*Adds to more than 26 pct because some gave more than one answer.

Recent institute polls have shown a steadily increasing number of voters expressing concern over world affairs. While 47 pct today say that foreign policy is the most important problem facing the nation, only 16 pct held that view a year ago.

The State Dept. has a special section devoted to placing information on foreign affairs before the public. It maintains distribution centers for educational material in Boston, New York, Chicago, New Orleans and San Francisco, and provides speakers to explain current policies and provide background for understanding issues.

It should be pointed out that the administration can go only so far in informing the public before it runs into the charge of "propagandizing.'

•

• • • **The mystery man** of the 1948 presidential campaign is Gen. Dwight D. Eisenhower.

The country isn't sure whether he is a Republican or a Democrat. But a very substantial number of voters in both parties think he ought to run for president.

When the General accepted the presidency of Columbia University, starting next year, speculation about this political future immediately began. It was argued that by leaving the army he would become "available" for the 1948 presidential race, although General Eisenhower himself has remained strictly silent on the subject.

In view of the speculation, the institute sounded out the attitudes of the nation's voters toward the famous war hero as a possible political leader. From coast-to-coast a cross-section of the electorate was asked:

"Do you regard General Eisenhower as a Republican or a Democrat?"

The percentage who think he is a Democrat is neatly balanced by the percentage who believe him a Republican, although by far the largest number say they just can't make up their minds what he is.

	Pct
Think Eisenhower is a Republican	22
Think he is a Democrat	20
Don't know	58

There's a tendency for Democratic voters to claim him as a Democrat and for Republicans to claim him as a member of their team. The General hails from Kansas, a strongly Republican state, where a number of Republican leaders are reported to be setting the stage for an Eisenhower boom.

Voters Wonder About General Eisenhower for Next Election. Is He Republican or Democrat?

o o o

The fact that the General is comparatively free from traditional political tags may enhance his pulling power as a candidate with the people, although it might limit support for him from party machines and bosses.

In any case, about one third of the nation's voters would like to see him run in 1948.

"Would you like to see General Eisenhower become a candidate for President in 1948?"

The vote:

	Pct
Yes	35
No	48
No opinion	17

However, comparatively few voters in either party have up to now given much thought to General Eisenhower as a possible candidate.

That is shown by the fact that when the institute has in recent months asked voters, "What man would you like to see elected president in 1948?" only 4 pct of Republicans with opinions and 6 pct of Democrats volunteer his name. One reason, undoubtedly, is that there has been less publicity about him as a possible candidate than about such men as Gov. Thomas E. Dewey, Harold E. Stassen, President Truman and others who lead the field of popular choices.

One very important asset of General Eisenhower is his popularity with the working classes. In the recent survey the occupa-

(CONTINUED ON PAGE 120)

Industrial Briefs . . .

• OPENS N. Y. OFFICE—Douglas M. McBean, Inc., Consulting Engineers of Rochester, N. Y., announce that, in order to properly serve the increasing number of clients, an office has been opened at 61 W. 56th St., New York 19. Messrs. Douglas McBean, Robert Hall and Carl Lamb will divide their time between the main Rochester and the newly opened New York City offices.

• POWDER METALLURGY FIRM—A new corporation devoted to consultation, research and development in the field of powder metallurgy, Sintercast Corp. of America, New York, has been formed by Erwin Loewy, president of Hydropress, Inc., and two associates, Dr. Claus G. Goetzel and John Ellis.

• CANADIAN SUBSIDIARY—Rheem Manufacturing Co. announced the formation of a subsidiary company in Canada, to be known as Rheem Canada, Ltd. The offices and plant of the new company are located in Hamilton, Ontario. The president is R. S. Rheem. The company will manufacture steel shipping containers for the petroleum, chemical, food, paint and other industries.

• MOVES SALES OFFICE — The Wickwire Spencer Steel Div. of the Colorado Fuel & Iron Corp. has moved its sales headquarters from Buffalo to New York City.

• A-C BUYS FOUNDRY — The Hirshheimer Foundry, La Crosse, Wis., has been purchased by the Allis-Chalmers Mfg. Co., Milwaukee, to increase and insure better control of its gray iron castings.

• DIAMOND JUBILEE — The Huenefeld Co., Cincinnati, manufacturers of kerosene and wood-burning ranges, stoves and ovens, will celebrate its Diamond Jubilee.

• J&L BOILER PLANT — A new Southside boiler house will be erected by Jones & Laughlin Steel Corp., Pittsburgh, which will cost in excess of $4 million. The general contract was awarded to Rust Engineering Co. Babcock & Wilcox Co. will furnish the steam equipment.

• MOVES — Sommer & Adams Co., special machinery builders, formerly located in Cleveland for more than 30 years, has moved to Warren, Ohio. The Cleveland plant covers more than 33,000 sq ft of floor space and is up for sale. Some machinery will be moved to Warren and the rest will be sold with the plant, if possible.

• EXPANDS ABRASIVE DIVISION —The Carborundum Co., Niagara Falls, N. Y., has purchased from the War Assets Administration four buildings and a 65-acre tract of land. The company will use the facilities for expansion of its Coated Abrasives Div. Carborundum paid $1 million for the property and buildings and plans to erect a fifth building on the site.

• ACQUISITION—Peninsular Grinding Wheel Co., Detroit, has purchased all physical assets of The Detroit Star Grinding Wheel Co., located in Detroit. The new plant space totals 100,000 sq ft. Modernization will start immediately. The new acquisition marks Peninsular's entry in the vitrified grinding wheel field.

• EATON CHANGES ADDRESS—Reliance Div., Eaton Mfg. Co., Cleveland, has acquired a 5-year lease on two floors of Marchand Bldg., Massillon, and will establish offices there. Between $20,000 and $25,000 will be spent to repair, renovate and reconvert this into office space.

• BUYS NEW DIVISION — Angell Mfg. Co., Dayton, has purchased the Products Identification Div., Stanley Mfg. Co., also of Dayton, to broaden its production of metal name plates, decorations, instrument dials and allied products.

Nelson of Dow Chemical Is AFA Hoyt Lecturer

Chicago

• • • **Charles E. Nelson,** technical director of the magnesium division, Dow Chemical Co., Midland, Mich., will present the Charles Edgar Hoyt Annual Lecture at the 1948 convention and show of American Foundrymen's Assn. in Philadelphia next May, AFA headquarters has announced. He will speak on "The Control of Grain Size in Magnesium Castings."

Charles E. Nelson

The lectureship was established by AFA in 1938 to bring the annual meeting of its members an authoritative discussion of an important phase of foundry technology. It was renamed last year to honor C. E. Hoyt, retired AFA treasurer.

Active in many technical groups of the AFA, Mr. Nelson is a member of the international technical society's aluminum and magnesium division executive committee, and has served on that body since its organization.

Weekly Gallup Poll

(CONTINUED FROM PAGE 119)

tion group showing the highest vote in favor of his becoming a candidate is the manual worker group.

That is the section of the population where the Republicans are most in need of votes.

The attitudes by occupation groups toward General Eisenhower's candidacy is shown in the following:

Should Eisenhower Run?

	Yes Pct	No Pct	Undec. Pct
Farmers	24	54	22
Prof. & Bus.	25	64	11
White collar	31	54	15
Manual workers	44	37	19

The substantial support in the manual worker group may stem in part from the enthusiastic reception which General Eisenhower won from the CIO when he addressed the union convention early this year. In fact, that speech was in large responsible for starting speculation about the General for 1948.

You'll see BIG THINGS

. . . in Parker-Kalon's Booth 243-A at the Machine Tool Builders Show!

WORLD'S BIGGEST CAP SCREW

a precision-made giant that features **P-K SIZE-MARK** One of the Biggest Improvements ever made in Socket Head Cap Screws. Ends Guessing, Errors, Lost Time!

WORLD'S BIGGEST SET SCREW

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P-K GROUND THREAD

Another Big Advancement by P-K

TWO P-K "FIRSTS" you'll want to see at the big Show in the Chicago-Dodge plant. Two important developments, offering benefits in your product assembly, which you'll want to know about. Visit the P-K booth. Write for samples and details. Parker-Kalon Corp., 200 Varick St., New York 14.

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SOLD ONLY THROUGH ACCREDITED DISTRIBUTORS

PARKER-KALON *Cold-forged* **SOCKET SCREWS**

Sets Up Service For Overseas Business Men Visiting London

New York

• • • **Facilities for** the overseas business man visiting London are offered by International Business Services at their recently-opened headquarters in Arlington Street, Piccadilly. The subscriber can have mail, packages, cables, telephone calls and personal callers received on his behalf and dealt with according to his instructions. In his absence, mail is held for collection or forwarded, according to British sources.

An information bureau is ready to answer queries and to assist in dealing with trade problems. Advice and practical assistance are given in tackling questions relating to government orders and regulations, import and export licenses, banking and currency restrictions, access to supplies of raw materials and finished products, markets for manufactured goods, freight and insurance, publicity and advertising, it was said.

A reference library contains up-to-date trade manuals, directories, time-tables, maps, magazines, newspapers, and facilities for writing memoranda. Trained stenographers are available to take and type letters in English, French or Spanish, and other languages.

A conference room can be booked in advance for business meetings. Members of the staff speak several languages, and will contribute in every way possible to the success of a visit to London, it was said.

Quarterly Earnings Drop

Boston

• • • **Greenfield Tap** & Die Corp. and its subsidiary The Geometric Tool Co., for the second quarter showed a net profit of $209,079, equal to 91¢ a share, whereas for the like 1946 quarter the net profit was $277,694, or $1.20 a share. The net, before provision for taxes, this year was $363,079; last year $442,404.

For the first half of this year the net was $454,005, or $1.97 a share; contrasted with a net of $445,425, or $1.93 a share in the first half of 1946.

New Canadian Mines Yearbook Reflects Drop in Speculation

Toronto

• • • **During the past** year there has been a considerable decline in the number of companies actively engaged in mining operations in Canada. No less than 458 companies which were busy a year ago have ceased work. Of the 531 mining companies incorporated in Canada during the past 12 months only about half progressed beyond the incorporating lawyer's office and became active. Some 76 companies formerly inactive resumed work.

These facts are shown by the 1947 edition of the Canadian Mines Handbook, just published. The total number of live mining companies in Canada is 1,653, as compared with 1,765 in the 1946 edition, when listings reached an all time high.

While gold mining operations, and particularly exploration endeavors, suffered a relapse the handbook shows that base metal mining enjoyed a moderate expansion and there was a broadening of interest in iron ore.

Due to metallurgical and other scientific progress—several rare metals were added to the country's production roster. Higher prices for silver awakened many silver mines long moribund. The discovery of a new nickel range in Northern Manitoba, comparable in extent at least with Sudbury's, aroused the forming of numerous new companies.

The Canadian Mines Handbook is published by Northern Miner Press, Ltd., Toronto, and contains 424 pages.

U-E Sales Soar

Pittsburgh

• • • **United Engineering & Foundry Co.** reported for the 6 months ended June 30, 1947, net income of $1,411,006 as compared to the 6 months ended June 30, 1946, when net income totaled $673,176 after a $570,000 carryback of excess profits credit.

Net sales for the first half of 1947 were $18,320,426, compared with $8,710,818 in the corresponding period a year ago.

Cash Steel Dividends Total $63.5 Million

Washington

• • • **Publicly reported** cash dividends paid by the iron and steel industry during the second quarter amounted to $63.5 million, up 21 pct from the $52.4 million paid during the comparable quarter last year, the Dept. of Commerce reports.

Dividends for all the nation's corporations for the quarter amounted to $1.1 billion, a 16 pct increase over last year's cash payments of $999 million, the Department said. June dividends amounted to $609 million, an 18 pct increase over the $517 million for June 1946.

While these figures include only those announced publicly, the Commerce Dept. estimates that they account for approximately 60 pct of all dividend payments.

The wholesale and retail trades showed the greatest increase for the quarter with a 42 pct increase over last year; mining dividends were up 35 pct.

Both automobiles and other transportation paid out less dividends than for last year—amounting to 30 and 14 pct less than a year ago.

A-C Income Gains

Milwaukee

• • • **Allis-Chalmers Mfg. Co.** reports net income for the first 6 months ended June 30, 1947, of $475,941, after provision for Federal income taxes of $360,000. The net income compares with a net loss of $8,926,432 for the same period in 1946, incurred because of strikes in seven of the Allis-Chalmers' eight plants. Net income for the 3 months ended June 30 amounted to $2,997,806, before provision for Federal income taxes. Billings in the second quarter of this year amounted to $52,598,080 as compared with $23,254,087 in the second quarter of 1946. Billings for the 6 months ended June 30, 1947, amounted to $84,886,896 compared with $51,967,115 in 1946. Unfilled orders on June 30 of this year amounted to $143,743,722 as compared to the 1946 amount of $65,171,780.

Says Output Need Not Suffer in Order To Improve Mine Safety

Washington

• • • **It is not** necessary that production suffer in bringing about increased safety in the coal mines, according to Capt. N. H. Collisson, USNR, in making his report on government operation of the bituminous mines.

"The record of 620 million tons of coal produced during this period is second only to coal produced in the comparable period from July 1, 1943 to June 30, 1944," Collisson said.

Yet, the Federal Mine Administrator said, during the 11-month period of government possession there were 2429 regular inspections and 629 special inspections, for a total of 3058. These revealed 62,000 violations of the Federal Mine Safety Code, of which 40,000 were subsequently corrected. An additional 9300 violations were in the process of correction at the termination of government control.

It was pointed out that this was the first opportunity to apply a uniform set of safety rules on a nationwide basis with a means of enforcement. It was necessary for 627 mines pending correction, of which 575 were permitted to reopen after conforming to the code.

In the current contract with the miners, both UMW and the operators voluntarily accepted the code which has the effect of continuing uniform mine safety for another year.

A complete report of government operation, together with comment on pre-shift examination, ventilation, blasting practices and other matters may be obtained on request from the Dept. of the Interior, Washington, D. C.

Employees Get $279,018

Peoria, Ill.

• • • **Checks totaling** $279,018 were mailed today to 1858 eligible Keystone Steel & Wire Co. employees under the company's profit sharing plan for the fiscal year ended June 30, 1947. Employees who worked fifty weeks or more during the past fiscal year received $158.40, compared with $74.57 last year.

Canadian AFA to Meet

Chicago

• • • **Eastern Canada** and Newfoundland chapter of American Foundrymen's Assn. will sponsor a regional foundry conference Sept. 12-13 at Sherbrooke, Quebec.

Many castings industry engineers and technologists from the United States are expected to join their Canadian colleagues for the 2-day meeting. Headquarters for the conference will be the New Sherbrooke Hotel.

Chairman of the arrangements committee is James H. Newman of Newman Foundry Supply, Ltd., Montreal. James Grieve, assistant supervisor, and Alfred H. Lewis, metallurgist with Dominion Engineering Works, Ltd., are vice-chairman and secretary, respectively.

M. A. Hanna Net Advances

Cleveland

• • • **M. A. Hanna Co.** has reported consolidated net profit of $3,032,491 for six months ended June 30, 1947. The profit, which is after provision of $782,742 for depreciation and depletion and $756,785 for federal income taxes, is equal after preferred dividends to $2.74 a share on the 1,030,464 common shares.

In the first half of 1946, profit was $2,231,393, equal to $1.97 a common share, after provision of $766,254 for depreciation and depletion and $557,768 for federal income taxes.

Net profit the second quarter of 1947 was $1,890,677, equal to $1.73 a common share, and comparing with $1,210,922, or $1.08 a common share, in the corresponding period last year.

Inventories Reported Up

Washington

• • • **With deliveries** from factories rising 3 pct in June over the May rate, manufacturers' inventories rose another $300 million in book value during June to reach $22.7 billion, Commerce Dept's. Office of Domestic Commerce reports. Most of the increases were in durable goods although nonferrous metals declined somewhat. Dollar volume of factory shipments for the sixth month was set at $13.6 billion.

Private Construction Expenditures at High

Washington

• • • **Supporting recent** Commerce Dept. forecasts of continued high levels of construction activity, the Bureau of Labor Statistics reports that not only was there an increase in employment in the construction industry during July but that private expenditures for the industry is at an all-time high.

Employment by building contractors totaled 1,817,000 for July, an increase of 55,000 over June and 190,000 over July a year ago.

At the same time, in a separate report, the BLS reveals that wage rates of unionized workers in the building trades have advanced 15 pct over the past years. In effect, this amounts to an increase of about 25¢ an hour in pay.

These hourly rate increases were negotiated after the removal of wage controls last November. Since 1939, the BLS reports, total wage increases amounted to 49 pct, of which only 18 pct had been granted up to the time controls were removed last year.

Slightly more than $1.3 billion worth of building was put in place during July, of which more than a billion involved private expenditure—6 pct over June and 16 pct above the former peak, August 1946.

Building and repair of nonfarm homes amounted to $478 million in July; non-residential construction, $318 million; farm construction, $118 million, and public utilities, $122 million, according to BLS.

Graphite Plant to Reopen

Washington

• • • **Conversion of a former** surplus graphite electrodes plant at Morganton, N. C., to production of a special graphite for the Atomic Energy Commission will be undertaken in the near future, according to the WAA which has just sold the former war plant to the Great Lakes Carbon Corp. for a consideration of $2 million.

Acquired at approximately one-third its original cost, some of the property will be leased to the National Carbon Co. for production of the material for AEC.

Ore Consumption Falls With Canadian Strike

Cleveland

• • • **U. S. and Canadian** blast furnaces consumed 6,156,401 gross tons of Lake Superior iron ore in July, according to the report of the Lake Superior Iron Ore Association.

July consumption, which was 343,481 tons less than June, fell behind primarily because of the Canadian steel strike. Canadian furnaces consumed 238,190 tons in June, and 37,506 tons in July. Cumulative consumption of Lake Superior iron ore at the end of July was 46,387,053 tons, compared with 30,665,323 tons on the same date a year ago.

Gross tons of iron ore on hand at furnaces and Lake Erie docks totaled 21,440,332 tons Aug. 1, as compared with 21,745,798 July 1, and 30,438,615 a year ago.

Blast furnaces depending principally on Lake Superior ore numbered 167 in the U. S. and eight in Canada. Idle furnaces numbered 16 in the U. S. and two in Canada.

The July movement of iron ore on the Great Lakes, aggregating 12,613,820 gross tons, was the greatest of any peacetime month in history, according to the Lake Carriers' Association. Nearest comparable movement of Lake Superior iron ore was 11,496,303 gross tons in August, 1941.

Merger Is Proposed

Cleveland

• • • **A proposed merger** of Lima Locomotive Works, Inc., and General Machinery Corp., which, if approved, would establish a new corporation known as the Lima-Hamilton Corp., with consolidated assets of approximately $35,500,000, will be voted on by stockholders Oct. 1.

If the merger is approved, the new corporation will produce Diesel locomotives.

General Machinery Corp. manufactures large presses for the automotive industry, can making industry, and railroad and industrial machine tools.

Lima Locomotive, Inc., since 1928 has been a major producer of power shovels, draglines, cranes and related equipment. The two plants are within 100 miles of each other.

Powder Metals Patent Compilation Is Offered

Washington

• • • **A comprehensive list** of powder metallurgy patents — a valuable source of technical information on this new and undeveloped science—has been compiled following an extensive study of patent literature in connection with an investigation in the field of powder metallurgy at the National Bureau of Standards. Representing more than a century of progress in this art, this information, which was obtained from a collection search of 2253 patents, and classified in related groups with a short abstract for each invention, has been made available to industry and others interested in this specialized field as NBS publication M184, "U. S. Patents on Powder Metallurgy," by Raymond E. Jager and Rolla E. Pollard.

Published technical literature relating to this field is widely scattered, making it difficult for metallurgists to keep abreast of developments in this rapidly growing science. For this reason, the Bureau's listing and analysis of the patent literature classified as to production, handling and working, alloying, and application, should prove useful to those engaged in research and development in powder metallurgy. The publication is available from the Supt. of Documents, Washington 25, at 30¢ per copy.

Electro Refractories Expansion Proceeding

Buffalo

• • • **Electro Refractories** & Alloys Corp. had net income for the six months ended June 30th of $139,902, or $1.59 a common share, which compared with a profit of $112,805, or $1.28 a share, in the same period of 1946.

President G. S. Diamond said in the semi-annual report to stockholders that construction work on additions to the Lackawanna plant are proceeding. Foundations are ready for a new machine shop and the grinding wheel department, and ground will be broken soon for a new refractories department building.

Fractures Featured On Metal Show's Program

Cleveland

• • • **As a special 2-day** technical program, a seminar on "Fundamental Relations in the Fracturing of Metals," sponsored by the American Society for Metals and coordinated by Case Institute of Technology, will be held during the ASM annual meeting to be held in Chicago Oct. 18-24.

Five sessions will be held at the Palmer House, Saturday and Sunday, Oct. 18 and 19, as a part of the 29th annual National Metal Congress & Exposition.

Chairmen of the meetings include Dr. George Sachs, Case Institute of Technology, Cleveland; Dr. L. N. Donnell, Illinois Institute of Technology, Chicago; Dr. Cyril S. Smith, University of Chicago; D. F. Windenburg, David Taylor Model Basin, Washington; Dr. Finn Jonassen, National Research Council, Washington; Dr. J. H. Hollomon, General Electric Co., Schenectady; Dr. L. E. Grinter, Illinois Institute of Technology; Dr. Maxwell Gensamer, Pennsylvania State College, State College, Pa.; Dr. W. P. Roop, Swarthmore College, Swarthmore, Pa., and Dr. J. E. Dorn, University of California, Berkeley, Calif.

Bruce on Decontrol Group

Washington

• • • **David Bruce,** assistant Secretary of Commerce, last week was named chairman of a newly-formed Advisory Committee to administer the Second Decontrol Act of 1947.

Other members of the committee which will advise Secretary Harriman on controls over exports and scarce commodities are representatives of the State Dept., Agriculture Dept., Interior Dept., National Military Establishment and Office of Defense Transportation.

Mr. Harriman at the same time announced creation of a Review Committee to replace the former Export Policy Committee. This group consisting of representatives from agencies making up Mr. Bruce's committee, will serve as a working group and make recommendations to the Advisory Committee. The National Housing Agency also will be represented on the Review Committee.

Coal Cleaning Process Developed by Germans

Washington

• • • A German electrostatic cleaning process which reduces the ash content of coal to a tenth of what it was before the treatment is revealed in a British report now on sale by the Office of Technical Services, Commerce Dept.

"Electrostatic separation depends on the capacity of particles to hold an imparted positive or negative electric charge," Commerce's OTS says, "and to be subsequently attracted or repelled by high voltage electrodes. Such charges can be induced by frictional contact with a variety of other materials or by the effect of a brush discharge."

The principle advantage of the electrostatic process for cleaning fine coal, says the report, is that separation takes place in the dry state and thus avoids wet-working and sludge treatment. Also, it is claimed that the power and labor costs are less.

A pilot plant with a capacity of 1½ tons an hour had been put into operation by the Germans at the Osterfeld colliery at Gutenhoffnungshutte. A second pilot plant was built at Essen, with a 10 ton an hour capacity, but was never put into operation due to Allied bombings.

A microfilm of the 70-page report complete with tables and drawings may be obtained from the Office of Technical Services, Dept. of Commerce, Washington 25, D. C., for $2; photostat pages may be had for $5.

Building Trades Wages Up

Washington

• • • From July 1, 1946, through June 30, 1947, wage rates of union workers in the building trades advanced 15 pct, the greatest rise for any 12-month period since 1920, according to the Bureau of Labor Statistics. This is the equivalent to pay increases of 25¢ an hour in basic pay of nearly 500,000 craftsmen in the seven major construction classifications. Since 1939, BLS reported, increases have amounted to 49 pct. Plasterers and plumbers led the parade with an increase of 35¢ an hour over the past year.

Recovery Rate On Surplus Property Sales Is Declining

Washington

• • • **Fact that the** most desirable types of surplus property already have been sold or disposed of is borne out in War Assets Administration's reports of a 15 pct rate of recovery on July disposals.

The Government recovered $69 million during July on property originally valued at $753 million. Sales accounted for items originally worth $444 million, leases $19 million and donations, scrapping and transfers $291 million, according to WAA.

The 15 pct recovery rate is the lowest yet hit by WAA. June returns which were unusually high because of heavy aircraft sales for scrap, brought the Government a return of 20.9 pct. The cumulative rate of return stands at 33.1 pct. Inventories available for disposal are valued at $7.9 billion.

Real property disposals in July jumped to $267 million from $144 million in June. Aircraft disposals fell to $68 million after heavy June selling activity.

Portal-to-Portal Act Covers Certain Cases

Washington

• • • **The Labor Dept.** warns industry that not all employee actions for portal pay are restricted to the two-year federal statute of limitations provision of the Portal-to-Portal Act of 1947.

Under terms of the new act which became effective May 14, employee actions for back pay which are commenced by Sept. 11, 1947, may be controlled by longer periods in accordance with various state statutes of limitations.

The portal pay law provides that claims which arose before May 14, 1947, and are not of the type specifically barred by the new act, shall be governed by the prevailing state statute of limitations, if suit is commenced on or before Sept. 11, 1947.

If suits are commenced before Sept. 11, they will be limited by the state statute or the new law's two-year federal statute, whichever is shorter.

Alloy Casters Elect

New York

• • • **Paul G. Lutz,** vice-president and general manager, Standard Alloy Co., Inc., Cleveland, was elected president of the Alloy Casting Institute at the recent annual meeting of the institute held in Hot Springs, Va.

Other officers elected at the meeting were: W. B. Sullivan, manager of alloy sales, Lebanon Steel Foundry, vice-president, and E. A. Schoefer, Alloy Casting Institute, executive secretary and treasurer. H. A. Cooper, president, The Cooper Alloy Foundry Co., and J. D. Corfield, vice-president, Michigan Steel Casting Co., were elected to the board of directors of the organization for three-year terms. In addition, H. S. Avery, research metallurgist, American Brake Shoe Co., was elected chairman of the technical research committee.

The importance of continued research in the development of improved alloys to serve new applications in the power and chemical fields was recognized in the projects selected by the members for future research in the program which the institute has sponsored for a number of years at Battelle Memorial Institute, Columbus. Ohio.

New WAA Inventory Issue

Washington

• • • **A number of** iron and steel, chemical and light metal plants are included among the 723 surplus war plants listed in the revised edition of the WAA "Plant Finder," recently completed and ready for distribution.

The revised inventory gives basic information as to size, location, utilities, transportation and general characteristics. These are listed by states, indexed by lessees or operators, and classified as to products or functions.

Dupont to Decontaminate

Washington

• • • **E. I. DuPont** de Nemours Co., has purchased more than 100 items of surplus high explosive equipment from the Oklahoma Ordnance Works, Pryor, Okla., which it will decontaminate, remove and convert to production of peacetime tiems, WAA announced.

Austrian Steel Output Gradually Increasing

Pittsburgh

• • • **After the Austrian** occupation, steps were taken to reestablish the steel industry in the American and British zones. The extent to which this plan has been successful is reported at least in part in the Bureau of Mines' publication *Mineral Trade Notes*, dated May 20, 1947.

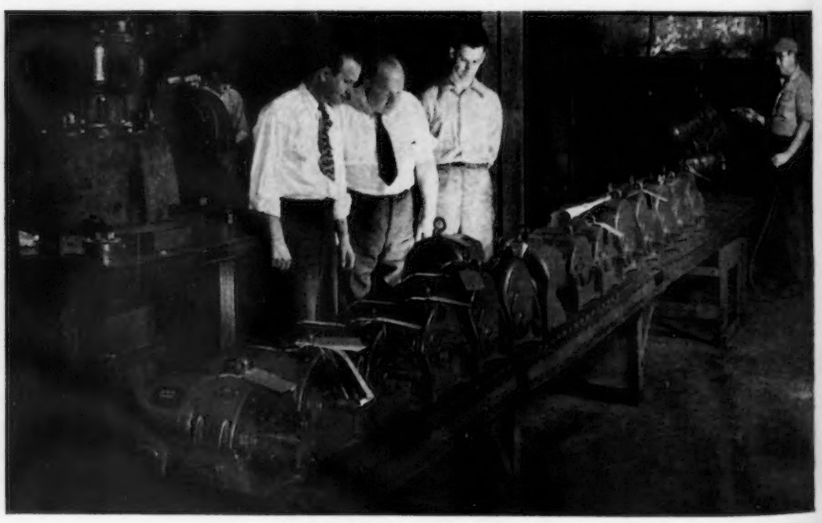
Iron and steel production in 1945 was low, owing to the lack of coal, power and the necessity for repairing plant equipment. Pig iron output for 1946, however, was 56,430 tons from August through December, most of which was produced at Donawitz. Steel production hit a peak of 28,935 tons in October, 1946, but dropped sharply during November. Total steel production for 1946 is as follows:

In January and February, 1947, 25,968 tons of steel and 12,458 metric tons of iron were produced despite a fuel and power crisis which permitted the operation of only one blast furnace at Donawitz and one coke oven battery at Linz.

American iron and steel experts in Vienna have expressed the opinion that under favorable conditions Austria can produce 650,000 to 800,000 or even 900,000 metric tons of steel, enough for internal requirements and a large surplus for export. The future of Austria's steel industry seems to depend upon the proper integration of certain parts of the United Iron and Steel Works (Donawitz) into the normal peacetime economy. There is a tendency in Austria to look upon this plant as a monstrous stepchild of the war rather than to visualize the efficient production and resultant economic advantages that can be obtained from modification of its present layout. Recommendations are for a 50 pct reduction in its blast furnace, ore handling and ore dressing equipment, and a considerable expansion in finishing facilities, especially for such products as pipe, tubing, rods, and sheets, none of which are produced in adequate quantities by Alpine Montan.

Plant	Location	Zone	Metric Tons
Alpine Montan Gesellshaft	Donawitz	British	120,578
Steirische Gusstahlwerke	Judenbert	British	8,445
Vereinigte Oesterreichische, A.G.	Linz	American	6,989
Gebruder Boehler	Knapfenberg	British	27,838
Schoeller-Bleckmann	Ternitz	Soviet	11,739
Felton & Guilleaume	Diemlach	British	9,766
Schmidhuette Liezen, A.G.	Liezen	British	1,649
	Total		187,004

FIRST GEARMOTORS: *These are the first gearmotors using the new Westinghouse Life-Line motor to come off the assembly line at the company's gearing div. plant, Pittsburgh. Spectators, in the usual order, are: production supervisor M. L. Udavchak, division manager L. R. Botsai and group leader D. W. Mort, Jr.*



Ore Mining Safety Record Summarized

Washington

• • • **Although the safety** record of the Lake Superior iron-ore district still compares favorably with that of other metal-mining sections, coordinated efforts by labor and management to check and perhaps reverse a rising accident trend are recommended in a publication of the Bureau of Mines which reviews the 1940-45 accident experience of the nation's chief iron-producing area.

Prepared by Frank E. Cash, supervising engineer of the Bureau's Mine Safety Station at Duluth, Minn., the publication points out that accidents in the 120 metal mines of the district increased in frequency and severity in practically all operations during the six-year period. Noting that the most severe accidents occurred during sub-level caving, stopping and top slicing operations and in open-cuts and concentrator plants, the publication attributes a large percentage of them to falls and slides of ground, haulage, machinery, falling persons and material, and the handling of loading equipment and material.

Induction of experienced workers into military service during the 1940-45 period was a principal factor causing the rising accident trend, the publication states. As a result, mine operators were confronted with the need for increased production with fewer workers. "This combination of circumstances had, and continues to have, a definite effect upon the injury experience," the publication adds.

While observing that the accident record of the Lake Superior area is satisfactory when compared with the safety performance of the metal-mining industry generally, the publication recommends the adoption of vigorous safety programs "not only to stem but to improve the experience."

Statistical information presented in the Bureau's latest study of the wartime accident experience of the Lake Superior region includes a comparison of the frequency and severity rates of mines in the district with those in the National Safety Competition and totals for the United States, analyses of accidents by causes and types of operation, and a listing of accident severity by causes. A brief summary of safety practices and employee-training programs observed at many mines throughout the area is also given in the publication.

Ferrosilicon Plant Sold to Operator

Washington

• • • **The Pittsburgh** Metallurgical Co., Niagara Falls, N. Y., has purchased for $325,000 a war-surplus ferrosilicon plant in Charleston, S. C., according to the War Assets Administration.

The plant was built by the government on the site of the Pittsburgh Metallurgical Co's. Charleston plant to increase war production and is so intermingled with company-owned facilities that it cannot be operated independently.

Buildings and equipment included in the sale are a main production building with furnace room, three electric furnaces, machine shop, storage house, ferrosilicon building and morley tower. Transportation and utility services are furnished by the private company.

Western Coal Studied

Washington

• • • **Analyses of coal** deposits in the five western states of Arizona, California, Idaho, Nevada and Oregon is presented in a new Bureau of Mines publication (Technical Paper 696).

Bureau of Mines estimates Arizona coal reserves at slightly more than 15 billion tons, California and Oregon at 1 billion tons and Idaho and Nevada at 700 million tons. Most of the deposits are of subbituminous or lignite rank.

Patent Head Appointed

Washington

• • • **Lawrence C. Kingsland,** St. Louis patent attorney, this week was scheduled to succeed Casper W. Ooms as Patent Commissioner.

A member of the St. Louis firm of Kingsland, Rogers & Ezell, Mr. Kingsland has served as a patent attorney since 1908 and is a member of the St. Louis and Missouri Bar Assn. and of the American Bar Assn.

Scrap Shortage

(CONTINUED FROM PAGE 113)

war sources by exchange difficulties and the impossibility of buying in the American market. But these same sources believe that in the economic merger of the United States and British zones of Germany the United States may lose some potential scrap tonnage. It is known, for instance, that some British steel men actually have such an objective in mind.

In view of past performances there is felt to be little hope—barring an abrupt change in policy—of real governmental help in making this scrap available to American industry. The federal government has known of the seriousness of the American scrap supply problem for more than a year. Washington sources report that there are still some officials there whose primary job is scrap. Whether they can make themselves heard enough to get positive action is another matter. "That," said a scrap broker, "I would like to see."

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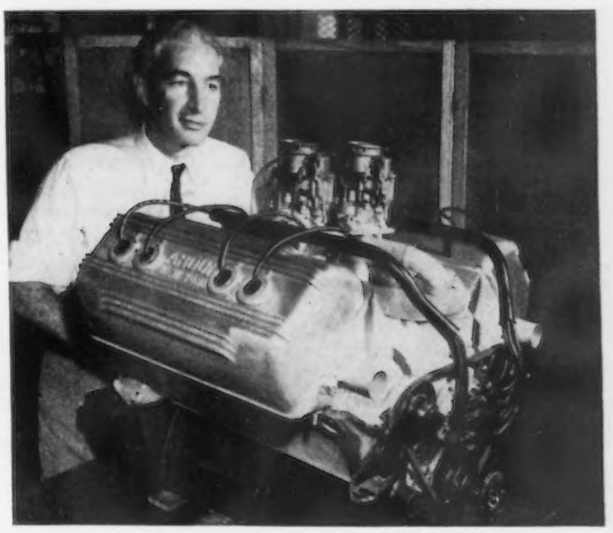

MODIFIED V-8: This is a modified Ford V-8 engine which uses the block of the former in combination with aircraft type overhead valves with hemispherical combustion chambers. Z. Arkus-Duntov, president of the Ardun Mechanical Corp., New York, is the inventor of this experimental model.

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Studebaker Is Last Of Auto Firms To Be Announcing Increases

Detroit

All car producers have announced price increases since the recent jump in steel prices. The new Ford price boost of $20 to $97 followed closely on the heels of the Chrysler announcement of increases of $45 to $143, effective August 18 on passenger cars and trucks. The Willys-Overland jeep station wagon price has been increased by $63.34 and most of its 4-wheel drive trucks will have their price tags raised by $47. Prices on the jeep and 2-wheel drive trucks are left unchanged.

In announcing its price change, Ford called attention to the fact that on January 15 of this year the company reduced all its Ford passenger cars from $15 to $50. This move was taken the company said, in the hope of reversing the trend toward rising prices.

"We have held with this lowered price line on Ford passenger cars for seven months and even now, with these increases, we still will offer the lowest priced six-cylinder tudor sedan and six-cylinder three-passenger coupe," Ford said.

"Since January 15 we have absorbed all added costs involved in building our passenger cars. Even our current price increases will fail to recover for us the amount of our increased costs for the remainder of 1947. Ford Motor Co. will try to absorb the remainder of the increased costs as well as abnormal costs in line with its policy always to keep prices as low as possible," the announcement said. Ford explained the company has been spending millions of dollars above regular operating costs to maintain stable employment and maintain production schedules on less than 70 pct of capacity. Ford explained that the company had paid an extra $5 million alone for steel so far this year to obtain steel "through the regular channels."

"We have purchased some steel at almost twice the normal cost because it had to be produced in electric furnaces. We have shipped ingots at further additional cost to other plants to be rolled in sheet steel for our production.

"The company will continue to ship coke produced in Ford coke ovens at the Rouge plant to suppliers who require coke in the production of steel.

"We recently have contracted to purchase pig iron in Texas to ship here for further processing," Ford said. "Wherever sound engineering permitted, we have used costly substitutes for steel such as aluminum, in order to produce the greatest possible number of cars and trucks with the available steel."

Many Ford departments have been forced into overtime to obtain balanced production in the face of specific materials shortages, according to a Ford spokesman.

Chrysler price increases average $87 on all the corporation's passenger models and $65 on most of its Dodge trucks.

Price increases have previously been announced by General Motors, Packard, Nash, Kaiser-Frazer and Hudson. GM price increases range from $57 to $168. Packard increases range from $92 to $200, and Nash increases from $95 to $168.

On August 11, Kaiser-Frazer raised the price of its Frazer by $99. On August 18, a similar increase was announced for the Kaiser model.

The Hudson increase ranges from $45 on its Convertible to $95 on other models. A recent Studebaker announcement boosted passenger car prices from $50 to $115.

Entrance to Germany Has Been Made Easier

Washington

• • • **Businessmen will** find it easier to gain admission to the British and American zone of Germany as a result of revised entrance regulations issued last week by the War Dept.

Buyers who do not require food, transportation or military government accommodations or supplies other than gasoline now are being admitted ex-quota. Such visitors may visit the U.S.-British zone for repeated visits not to exceed a total stay of 21 days during any 6-month period or a single visit in excess of 5 days, the War Dept. ruling states.

The department points out that the new procedure requires potential buyers not requiring military assistance to be sponsored by the same agency of their government which sponsors buyers admitted within quotas. The sponsorship serves as a bona-fide guarantee of the visitor.

American permits are issued in Washington by the Military Permit Section, Civil Affairs Div., War Dept., and abroad by the military permit offices of U. S. embassies.

Gasoline coupon books may be purchased by holders of ex-quota military entry permits.

Coming Events

Sept. 8-12 Instrument Society of America, conference, Chicago.

Sept. 10-11 Porcelain Enamel Institute, ninth annual forum, Columbus, Ohio.

Sept. 17-26 National Machine Tool Builders' Assn., machine tool show, Dodge-Chicago Plant, Chicago.

Sept. 18-20 Foundry Equipment Manufacturers Assn., annual meeting, Hot Springs, Va.

Sept. 18-20 National Assn. of Foremen, annual convention, Los Angeles.

Sept. 22-25 Assn. of Iron & Steel Engineers, annual meeting, Pittsburgh.

Oct. 2-3 Gray Iron Founders' Society, annual convention, Milwaukee.

Oct. 2-4 Society of Automotive Engineers, aeronautics meeting, Los Angeles.

Oct. 6-7 Packaging Machinery Manufacturers Institute, annual meeting, Springfield, Mass.

Oct. 6-8 American Gas Assn., annual convention, Cleveland.

Oct. 9-10 Porcelain Enamel Institute, annual meeting, Cleveland.

Oct. 16-17 National Conference on Industrial Hydraulics (formerly Hydraulics Machinery Conference), annual meeting, Chicago.

Oct. 18-24 National Metal Exposition, Chicago.

Oct. 30-Nov. 1 American Society of Tool Engineers, semiannual meeting, Boston.

Oct. 31 Illinois Mining Institute, annual meeting, Springfield, Ill.

Nov. 7-8 Annual Conference on X-Ray and Electron Diffraction, Mellon Institute of Industrial Research, Pittsburgh.

Construction Steel . . .

• • • **Fabricated steel inquiries** this week included the following:

16000 Tons, Tacoma, Wash., Tacoma Narrows bridge, Director of Highways, Olympia, Wash., bids to Oct. 15.

910 Tons, Shasta County, Calif., superstructure for bridge, Junction Route 3, Redding, California Div. of Highways, Sacramento, bids to Sept. 24.

655 Tons, San Joaquin County, Calif., bridge across San Joaquin River at Mossdale, California Div. of Highways, Sacramento, bids to Sept. 17.

615 Tons, Humboldt County, Calif., bridge superstructure adjacent to Klamath and at Weitchpec, California Div. of Highways, Sacramento, bids to Sept. 17.

600 Tons, Portland, Me., First National Stores market.

295 Tons, Tuolumne County, Calif., bridge across Tuolumne River at Stevens Bar, California Div. of Highways, Sacramento, bids to Sept. 24.

175 Tons, Tehama County, Calif., bridges across Thomas Creek and Reeds Creek near Red Bluff, California Div. of Highways, Sacramento, bids to Sept. 24.

155 Tons, Larimer County, Colo., bridge on Highway 185 between Timnath and Wellington, State Highway Dept., Denver.

• • • **Fabricated steel awards** this week included the following:

1090 Tons, Martinsville, Ind., transmission tower for Indiana Power & Light to American Bridge Co., Pittsburgh.

1030 Tons, State of Kansas, Santa Fe Ry. beam span to Bethlehem Steel Co., Bethlehem.

460 Tons, Thompson Falls, Mont., railroad truss bridge for Northern Pacific R. R. Co. to American Bridge Co., Pittsburgh.

400 Tons, Fort Wayne, Ind., bridge No. 2812 through Reece Riley Co. to Midland Structural Steel Co., Cicero, Ill.

275 Tons, State of Kansas, Santa Ry. beam span to Kansas City Structural Steel Co., Kansas City, Kan.

120 Tons, Boys Town, Neb., field house, Father Flanagan's boys home to Gate City Iron Works, Omaha, Neb.

100 Tons, Tonawanda, N. Y., research laboratory for E. I. du Pont de Nemours & Co. to Bethlehem Steel Co., Bethlehem, through George W. Walker & Sons, Inc., general contractors.

• • • **Reinforcing bar inquiries** this week included the following:

950 Tons, Tacoma, Wash., Tacoma Narrows bridge, Director of Highways, Olympia, Wash., bids to Oct. 15.

500 Tons, Chicago, 21-story apartment building. H. S. Greenwald builder.

165 Tons, Shasta County, Calif., bridge, Junction Route 3, Redding, California Div. of Highways, Sacramento, bids to Sept. 24.

150 Tons, Yakima County, Wash., overcrossing over Northern Pacific Ry. on Selah Road, Director of Highways, Olympia.

105 Tons, Larimer County, Colo., bridge on Highway 185 between Timnath and Wellington, State Highway Dept., Denver.

• • • **Piling awards** this week included the following:

2500 Tons, sheet piling, including 250 tons with weep holes, cofferdam for Mt. Morris, N. Y., flood control dam, to Bethlehem Steel Co., Bethlehem, by U. S. Engineers.

125 Tons, T-piling, cofferdam for Mt. Morris, N. Y., flood control dam, to Bethlehem Steel Co., Bethlehem, by U. S. Engineers.

• • • **Railroad inquiries** this week included the following:

Erie R. R. has invited bids on 11 diesel switching locomotives and 1800 freight cars.

British Output Hangs On Increased Pig Iron And Coke Availability

London

• • • **Production of steel** ingots and castings in the United Kingdom in July was at an annual rate of 11,007,000 long tons compared with 13,206,000 tons in the previous month and 11,759,000 in July 1946. Average weekly production during July was 226,000 tons against 239,900 tons in June.

Production continues to be limited by coal supplies and the latest figures were affected to a greater extent than usual by vacations. The new arrangement for 6 days additional holidays with pay also has to some extent increased the length of the holiday period this year.

The total steel production for the first 7 months of the year up to the week ending Aug. 2, amounted to 7,040,000 long tons. To achieve the government target of 12½ million tons for 1947, production will need to be stepped up for the rest of this year to an annual rate of 13½ million tons. This expansion and achieving the target for 1948 of 14 million tons will largely depend on securing the additional output of pig iron.

Two additional blast furnaces came into operation at the beginning of August and 6 further furnaces are planned to be blown in before the end of September. Two of these, one at Consett in County Durham and one at Colvilles works in Scotland, are new furnaces forming part of the modernization program on the blast furnace side.

More pig iron of course means more coke and more coal and a determined effort is now being made to supply the necessary fuel. During the last few days coke has been flowing to the blast furnaces in much greater measure. Discussions, negotiations and arguments are still going on between the people concerned but the chances are that the necessary coke will be supplied. The government certainly seems to be determined that steel production should be expanded and it is believed in steel circles that coal and coke will go to the industry whoever else goes short. There is a number of blast furnaces which still can be brought into use and it is the intention to blow these in at the earliest possible moment.

The British Iron and Steel Board has expressed concern about unauthorized exports of second-hand re-usable steel tubes, in particular locomotive seamless boiler tubes. They stress that second-hand tubes may not be exported except by sanction of a disposal license issued by the Iron and Steel Board. The fact that it is unnecessary to obtain a Board of Trade license does not relieve the licensee or exporter of the obligation to obtain authority to export from the Board. Although the Control Orders are binding on all licensees and second-hand dealers, unauthorized shipments have in fact occurred. The Board is taking a serious view of the matter and is warning licensees that non-observance of the orders may lead to proceedings being taken.

Anglo-U. S. German Zone Output Set at '36 Levels

London

• • • **The Anglo-American** military governments have agreed to restore industrial production in their joint zone in Germany to its 1936 volume, roughly 25 pct above that permitted at present. Steel production has been set at 10.7 million metric tons of ingots, retaining 56 pct of existing capacity.

In percentage of the 1936 level, the revised levels for the various heavy industries are: steel 72 pct, heavy machinery 80 pct, light machinery 119 pct, and machine tools 83 pct. The automotive industry's level is 160,000 passenger cars, 61,500 trucks and 19,500 farm tractors. Crude copper output is set at 128,000 tons, refined copper at 215,000 tons. Zinc tonnage will be aimed at 180,000 and lead at 141,000.

MACHINE TOOLS

. . . News and Market Activities

Customer Cooperation Allows Show Display of Some New Lines

Cleveland

• • • **Frenzied activity at the** plants of machine tool builders heralds the approach of the opening of the Machine Tool Show on Sept. 17. Many of the tools which will be exhibited there represent the first production unit of a tool on which engineers and designers have been concentrating for many months in order to have readied for the exposition. Many of these tools will be displayed by the courtesy of the user who sacrifices his immediate production needs for the benefit of an industry that has not displayed its ware since 1935.

Revised estimates of the total number of machine tools to be on display at the show place this figure at between 2500 and 3000. At least 1000 tools were installed by Sept. 3. The aggregate consumption of power by operating equipment at the show will be tremendous but the largest single power consuming unit will be a tool actuated by a 159-hp motor.

Great physical endurance will be demanded of visitors to the show for it will contain three miles of aisles, although the NMTBA has done much to relieve their fatigue by investing $150,000 in bus transportation to the show from downtown Chicago and return. The fare to visitors will probably be established at $1.50 per trip.

Requests for accommodations are reported to have been flooding Chicago hotels to the extent that it is predicted that there will be an appreciable volume of airline commutation between the show and such cities as Milwaukee and Detroit. The Chicago airport is only 5 min by car from the exposition site. It is expected also that there will be a heavy volume of commutation by automobile from adjacent cities, particularly those from which it will not be necessary to traverse the heart of Chicago.

The show area will be half a mile from the loading platforms and it has been necessary to impress into service the largest army of material handling equipment ever assembled at an industrial exposition.

Company Consolidation Seen Strengthening Production And Sales Position

o o o

The crating of the machine tools to be displayed has been very costly to exhibitors, so in order to make it possible for them to recover and re-use their original boxes at the end of the show a complete duplicate of the exposition layout has been established outdoors where crates of each exhibitor will be warehoused at a location in the same relative position as his display space.

Observers of the shifting fortunes of the machine tool industry have been studying the purposes of some ten corporate consolidations in the industry since the end of the war. In the past the industry has gone through many periods where the identity of old established builders has been lost by means of consolidation or outright purchase. In 1920 there were 209 members of the NMTBA. In 6 years the names of a third of this number were no longer represented as members of the industry.

Postwar periods are always critical to the machine tool industry particularly. The present period is no exception and builders have been studying the problem of how to place themselves in the most advantageous competitive position. Often where ownership and management have been held by an old family line for generations it has been found advisable to sell out to or consolidate with a more aggressive, perhaps younger, tool builder. In other cases, mergers have made possible the acquisition of a more complete or more diversified line of products at lower cost than the purchase of patent rights and production facilities.

It is not too early for observers to predict that the recent wave of consolidations in the industry have placed it in a much sounder production and merchandizing position than before. However, the present industry breakdown has yet to be tested in the cold atmosphere of competition in a truly buyers' market. Industry members foresee that there may be further modifications of corporate structure on a broad scale over the next few years.

One of the most encouraging aspects of the realistic approach of the industry to postwar conditions, according to market observers, is the way in which it has turned to diversification of its product to serve fields outside the normal scope of the industry. Builders have recognized that the tremendous wartime tool production has seriously limited their potential postwar market. Therefore most builders, while stressing their primary function as machine tool manufacturers, have devoted some of their excess production facilities to other markets and in so doing have served to add stability to all their operations. Some builders have entered fields as far removed as road building equipment and textile machinery. This trend is not, of course, confined to the machine tool industry nowadays. However, it is a most significant departure from the conventional in this industry.

July shipments of machine tools as reported to the NMTBA were down about $5.5 million from June and dropped to only $16,423,362. On this basis the total of industry shipments as estimated from reported shipments was $18,663,000. Unfilled orders on hand by the industry rose $1.6 million to a total of $121,820,114.

In Detroit there are expected to be a few significant changes in the machine tool industry even if WAA dealer contracts are cancelled as of Aug. 31, as now reported. The solution to the surplus machine problem that appears most likely to be adopted by WAA here is that certain types of machines will be placed on a "continuing sale" basis for a definite period of time. The type of machines that will be so classified has not yet been disclosed.

NONFERROUS METALS

. . . News and Market Activities

Copper

• • • **Copper producers** report that domestic demand for copper is still in excess of available tonnages. While the demand from the wire mills is holding at heavy tonnages, it is not quite as brisk as it was 3 or 4 weeks ago. Producers have generally sold out September copper and are getting ready for October business. However, some members of the industry report that demand for October copper is not active. Some wire and cable manufacturers are reported in the last few weeks to have pushed back their deliveries somewhat due to shortages of other materials such as steel. Although there have been relatively few inquiries for October copper, producers say that these tonnages are somewhat higher than September orders and if this trend holds it is expected that deliveries in October will be higher than September. The export copper market is quiet, inasmuch as the British and French are covered for the year. However, producers are anticipating some fairly substantial export business soon. The quietness of the export market has not yet depressed Chilean production, according to the trade, because of the long period during which Chilean producers were operating at a high rate to keep up with demand.

The brass mills state that its tube mills are operating at maximum production rates. Rod and sheet mills have been cut back substantially in the last few months, as users had built up terrific inventories of both products due to the overall copper shortage and the brass mill backlogs. As this situation modified, consumers reduced their inventories sharply and, for several months, rod and sheet orders have been limited. It is apparent to the industry, however, that rod and sheet inventories have been reduced to the minimum and orders are beginning to accumulate. Brass mills say that early indications are that rod and sheet deliveries in October should be very much heavier than September. The brass mills indicate that they are still heavily overloaded with scrap taken in from fabricators and that the time is not right for them to begin buying dealer scrap.

Monthly Average Prices

• • • The average prices of the major nonferrous metals in August, based on quotations appearing in THE IRON AGE, were as follows:

	Cents Per Pound
Electrolytic copper, Conn. Valley	21.50
Lake copper, Conn. Valley	21.625
Straits tin, New York	80.00
Zinc, East St. Louis	10.50
Zinc, New York	11.005
Lead, St. Louis	14.80
Lead, New York	15.00

Lead

• • • **Reports from the** trade indicate that the lead market is quiet as consumers, now conscious of the better availability of the metal, have reduced their inventories and are no longer buying for forward delivery. Prices at current levels appear to be fairly stable and there are no signs indicative of a price reduction in the immediate future. One producer has described the market as being subject to the pre-Labor Day lethargy.

Zinc

• • • **There is considerable** easiness in the zinc market, but the closing down of some of the high-cost producers after the vetoing of the subsidy bill has encouraged producers to believe that market prices will remain firmly at established levels. Another factor which tends to build this opinion is the transfer of the Metals Reserve zinc stockpile to the permanent stockpile. Although this metal was never actually a threat to the market price structure, it is conceded that any tonnage as large as this not absolutely secured against being placed on the market, unquestionably had a depressing market influence.

Antimony

• • • **Antimony has been** in very restricted supply ever since the end of the war, but during the last few weeks supply has been catching up with demand to the extent that the government is arranging to increase export quotas on antimony. Producers have just been discussing this matter in Washington and it is reported that there will be a new export quota established within the next couple of weeks.

Cadmium

• • • **Cadmium producers** report that the first evidence of an easier supply position has made its appearance in this metal since the end of the war. So far it has had no effect on present high prices of cadmium but it is understood that the government may soon take action to increase export quotas.

Forgings Plants Sold

Washington

• • • **Four surplus aircraft** forgings plants, operated during the war by the Wyman-Gordon Co. in Worcester, Mass., have been sold to that company for $950,000, WAA has announced.

The facilities are intermingled with privately-owned Wyman-Gordon properties and cannot be operated independently.

Nonferrous Metals Prices

Cents per pound

	Aug. 27	Aug. 28	Aug. 29	Aug. 30	Sept. 2
Copper, electro, Conn.	21.50	21.50	21.50	21.50	21.50
Copper, Lake, Conn.	21.625	21.625	21.625	21.625	21.625
Tin, Straits, New York	80.00	80.00	80.00	80.00	80.00
Zinc, East St. Louis	10.50	10.50	10.50	10.50	10.50
Lead, St. Louis	14.80	14.80	14.80	14.80	14.80

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, f.o.b. shipping point (min. 10,000 lb)	15.00
Aluminum pig, f.o.b. shipping point	14.00
Antimony, American Laredo Tex.	33.00
Beryllium copper, 3.75-4.25% Be; dollars per lb contained Be	$17.00
Beryllium aluminum 5% Be, dollars per lb contained Be	$35.50
Cadmium, del'd	$1.75
Cobalt, 97-99% (per lb)	$1.65 to $1.72
Copper electro, Conn. Valley	$21.50
Copper, lake, Conn. Valley	21.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$80 to $90
Lead, St. Louis	14.80
Lead, New York	15.00
Magnesium, 99.8+%	20.50
Magnesium, sticks, carlots	36.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$85.00 to $87.00
Nickel, electro, f.o.b. New York	37.67
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$63 to $66
Silver, New York, cents per oz.	69.75
Tin, Straits, New York	80.00
Zinc, East St. Louis	10.50
Zinc, New York	11.005
Zirconium copper, 6 pct Zr. per lb contained Zr	$8.75

Remelted Metals

Brass Ingot

(Cents per lb, in carloads)

85-5-5-5 ingot	
No. 115	19.00
No. 120	18.50
No. 123	18.00
80-10-10 ingot	
No. 305	23.00
No. 315	21.00
88-10-2 ingot	
No. 210	28.75
No. 215	27.25
No. 245	21.25
Yellow ingot	
No. 405	15.25
Manganese Bronze	
No. 421	17.25

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys:	
0.30 copper, max.	15.75
0.60 copper, max.	15.50
Piston alloys (No. 122 type)	13.75
No. 12 alum. (No. 2 grade)	13.25
108 alloy	13.50
195 alloy	14.25
AXS-679	13.75
Steel deoxidizing aluminum, notch-bar, granulated or shot	
Grade 1—95 pct-97½ pct	14.50
Grade 2—92 pct-95 pct	12.50
Grade 3—90 pct-92 pct	11.75
Grade 4—85 pct-90 pct	11.00

Electroplating Supplies

Anodes

(Cents per lb, f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	37⅝
Electrodeposited	32.34
Rolled, oval, straight, delivered	32.59
Brass, 80-20, frt allowed	
Cast, oval, 15 in. or longer	33⅜
Zinc, Cast, 99.99	18¾
Nickel, 99 pct plus, frt allowed	
cast	51
Rolled, depolarized	52
Silver 999 fine	
Rolled, 1000 oz. lots, per troy oz.	67¼

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	43.00
Copper sulphate, 99.5, crystals, bbls	11.50
Nickel salts, single, 425 lb bbls, frt allowed	14.50
Silver cyanide, 100 oz. lots, per oz.	54.00
Sodium cyanide, 96 pct, domestic, 200 lb drums	15.00
Zinc cyanide, 100 lb drums	34.00
Zinc, sulphate, 89 pct, crystals, bbls, frt allowed	7.75

Mill Products

Aluminum

(Cents per lb, base, subject to extras for quantity, gage, size, temper and finish)

Drawn tubing: 2 to 3 in. OD by 0.065 in. wall; 3S, 43.5¢; 52S-O, 67¢; 24S-T, 71¢; base, 30,000 lb.

Plate: ¼ in. and heavier: 2S, 3S, 21.2¢; 52S, 24.2¢; 61S, 23.8¢; 24S, 24S-AL, 24.2¢; 75S, 75S-AL, 30.5¢; base, 30,000 lb.

Flat Sheet: 0.136-in. thickness: 2S, 3S, 23.7¢; 52S, 27.2¢; 61S, 24.7¢; 24S-O, 24S-OAL, 26.7¢; 75S-O, 75S-OAL, 32.7¢; base, 30,000 lb.

Extruded Solid Shapes: factor determined by dividing the perimeter of the shape by its weight per foot. For factor 1 through 4, 3S, 26¢; 14S, 32.5¢; 24S, 35¢; 53S, 61S, 28¢; 63S, 27¢; 75S 45.5¢; base, 30,000 lb.

Wire, Rod and Bar: screw machine stock, rounds, 17S-T, ¼ in., 29.5¢; ½ in., 37.5¢; 1 in., 26¢; 2 in., 24.5¢; hexagons, ¼ in., 35.5¢; ½ in., 30¢; 1 in., 2 in., 27¢; base, 5000 lb. *Rod:* 2S, 3S, 1¼ to 2½ in. diam. rolled, 23¢; cold-finished, 23.5¢ base, 30,000 lb. *Round Wire:* drawn, coiled, B & S gage 17-18; 2S, 3S, 33.5¢; 56S, 39.5¢; 10,000 lb base. B & S gage 00-1: 2S, 3S, 21¢; 56S, 30.5¢. B & S 15-16: 2S, 3S, 32.5¢; 56S, 38¢; base, 30,000 lb.

Magnesium

(Cents per lb f.o.b. mill. Base quantity 30,000 lb.)

Sheet and Plate: Ma. FSa. ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 14, 69¢-74¢; 16, 79¢-81¢; 18, 87¢-89¢; 22, $1.25-$1.31; 24, $1.71-$1.75.

Round Rod: M, diam, in., ¼ to ⅜, 47¢; ½ to ¾, 45¢ 1¼ to 2½, 43.5¢; 3½ to 5, 42.5¢. Other alloys higher.

Square, Hexagonal Bar: M, size across flats, in., ¼ to ¾, 52.5¢; ½ to ¾, 47.5¢; 1¼ to 2½, 45¢; 3½ to 5, 44¢. Other alloys higher.

Solid Shapes, Rectangles: M, form factors, 1 to 4, 46¢; 11 to 13, 49¢; 20 to 22, 51.5¢; 29 to 31, 59.5¢; 38 to 40, 75.5¢; 47 to 49, 98¢. Other alloys higher.

Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ to 5/16, $1.21; 5/16 to ¾, $1.12; ⅜ to 7/16, 97¢; 0.058 to 0.064, 7/16 to ½, 89¢; ½ to ⅝, 81¢; 0.065 to 0.082, ⅝ to ¾, 76¢; ¾ to 1, 72¢; 0.083 to 0.108, 1 to 2, 68¢; 0.165 to 0.219, 2 to 3, 59¢; 3 to 4, 57¢. Other alloys higher.

Nickel and Monel

(Cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	54	43
No. 35 sheets	..	41
Strip, cold-rolled	60	44
Rod		
Hot-rolled	50	39
Cold-drawn	55	44
Angles, hot-rolled	50	39
Plates	52	41
Seamless tubes	83	71
Shot and blocks	..	31

Zinc

(Cents per lb, f.o.b. mill)

Sheet, l.c.l.	15.50
Ribbon, ton lots	14.50
Plates	
Small	13.50
Large, over 12 in.	14.50

Copper, Brass, Bronze

(Cents per pound, f.o.b. mill effective June 11)

	Extruded Shapes	Rods	Sheets
Copper	33.53	....	33.68
Copper, hot-rolled	....	30.03	....
Copper, drawn	....	31.03	....
Low brass	34.04*	31.07	31.38
Yellow brass	32.39*	29.32	29.63
Red brass	34.65*	31.68	31.99
Naval brass	29.56	28.31	34.25
Leaded brass	27.98	24.39	30.13
Commercial bronze	35.52*	32.80	33.11
Manganese bronze	33.14	31.64	37.75
Phosphor bronze, 5 pct.	53.25*	52.25	52.00
Muntz metal	29.17	27.92	32.36
Everdur, Herculoy, Olympic, etc.	37.07	35.57	38.44
Nickel silver, 5 pct.	41.20	40.28	38.67
Architectural bronze	27.94	....	....

*Seamless tubing.

Scrap Metals

(Dealers' buying prices, f.o.b. New York in cents per pound.)

Brass Mill Scrap

(Lots of less than 15,000 lb.)

Cartridge brass turnings	14½
Loose yellow brass trimmings	15½

Copper and Brass

No. 1 heavy copper and wire	15½—16
No. 2 heavy copper and wire	14½—16
Light copper	13½—14
Auto radiators (unsweated)	8½— 9
No. 1 composition	10½—11
No. 1 composition turnings	10 —10½
Clean red car boxes	9 — 9½
Cocks and faucets	8½— 9
Mixed heavy yellow brass	7 — 7¼
Old rolled brass	7 — 7¼
Brass pipe	8 — 8½
New soft brass clippings	11 —11½
Brass rod ends	9½—10
No. 1 brass rod turnings	8½— 9

Aluminum

Alum. pistons free of struts	3½— 4
Aluminum crankcases	5 — 5½
2S aluminum clippings	8 — 8½
Old sheet & utensils	5½— 6
Mixed borings and turnings	— 2
Misc. cast aluminum	5 — 5½
Dural clips (24S)	5 — 5½

Zinc

New zinc clippings	6 — 6⅛
Old zinc	4¼— 4⅜
Zinc routings	1½— 2
Old die cast scrap	2½— 3

Nickel and Monel

Pure nickel clippings	15½—17½
Clean nickel turnings	14 —15
Nickel anodes	16 —17
Nickel rod ends	17 —18
New Monel clippings	10 —10½
Clean Monel turnings	7 — 8
Old sheet Monel	9½—10
Old Monel castings	7½— 8
Inconel clippings	8 — 8½
Nickel silver clippings, mixed	7½— 8
Nickel silver turnings, mixed	5½— 6

Lead

Soft scrap lead	10 —10½
Battery plates (dry)	5 — 5½

Magnesium Alloys

Segregated solids	6½— 7
Castings	4½— 5½

Miscellaneous

Block tin	63 —65
No. 1 pewter	48 —50
No. 1 auto babbitt	38 —40
Mixed common babbitt	11½—12
Solder joints	12 —13
Siphon tops	38 —39
Small foundry type	13 —13½
Monotype	12 —12½
Lino and stereotype	11½—12
Electrotype	9½—10
New type shell cuttings	11 —11½
Clean hand picked type shells	4½— 5
Lino and stereo dross	5 — 5½
Electro dross	3 — 3¼

Lead Products

(Cents per lb)

F.o.b. shipping point freight collect
Freight equalized with nearest free delivery point.

Full lead sheets	18.25
Cut lead sheets	18.75
Lead pipe, manufacturing point	17.50
Lead traps and bends	List +42%
Combination lead and iron bends and ferrules, also combination lead and iron ferrules	List +42%
Lead wool	19.50

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TWIN CITY	2545 University Ave., St. Paul (4), Minn.	NEstor 7311

UNITED STATES STEEL

SCRAP

. . . News and Market Activities

Prices Hold for Third Straight Week

New York

• • • **The only real** price activity this past week occurred at Buffalo, where a substantial purchase of heavy melting steel pushed the quotation there down to $37 to $38, off an average of $1.75 a gross ton. Specialties were stronger in Chicago and so were the cast grades. Aside from a little weakness in the Boston brokers' market these were about the only significant changes for the week.

The most amazing thing trade observers see in this market is the fact that it has been virtually unchanged for the past 3 weeks. And this despite the fact that there have been some fair sized purchases.

Mill buyers report that shipments have been flowing in at an excellent rate for the past few weeks. At one or two spots there was even fear that if cars continued arriving at the current rate there would be a rail embargo clamped on the plants scrap departments.

Those who follow the market from the buyer's viewpoint are feeling fairly comfortable at the moment but they are not at all sure the present rush of business isn't merely technical—a concerted unloading drive for fear of lower prices. Besides this, they point out that a lot of the shipments they are now receiving are on older and higher priced orders. Brokers pretty generally expect much heavier testing of current prices in the weeks to come. The overall, or long term scrap supply position can not be said to have improved substantially.

However, mills are thankful for the fact that production scrap is coming out in much better volume and more regularly than it was at this time last year. Then, when winter stockpiling was equally vital, unbalanced inventories and start and stop production raised havoc with this most important scrap source.

•

PITTSBURGH—Scrap market activity was effected by holiday lethargy this week. Brokers found it still difficult to pick up scrap even at the quotable range which is unchanged from last week. It may take a few more weeks to completely test current prices and to determine if any lower prices are in prospect. A further deadening influence on the market will be the Jewish religious holidays.

•

CHICAGO — Last week was exceptionally quiet with most observers predicting plenty of activity in the near future. Railroad lists lead off with a strong upward surge in almost all items. The mills are reported to be ready to start placing new orders and trade experts are predicting high prices. Historically September and October are the months in which the steel producers attempt to build up winter reserves. This year it is expected the rush will be much more hectic than usual and as a result higher prices are seen by some sources as probable and by October may exceed the high water mark reached in early August. Foundries continue searching for pig iron and cast scrap. Last week pig iron from Pueblo, Colo., was sold in considerable tonnage here at close to $57 a gross ton delivered.

•

CLEVELAND—There were no further price developments in the Cleveland or Valley markets last week, except that shovelings at Cleveland were bought in appreciable tonnage at $33. The $38.50 price for heavy melting was reinforced by an additional purchase at that price. All market factors are in agreement on the desirability of a lower price structure. However, there are few who expect to see prices go much lower in the fact of the approaching winter, a continuing high ingot rate and yards that are expected to have little scrap when the high priced orders have been completed. Most orders at the old high prices will end next week.

•

BOSTON — Market apparently has settled on a basis suggestive of increased business within another week. It is currently quiet, but most yardsmen are beginning to feel that prices have hit bottom. Current buying largely concerns old orders, little new business having been booked. Large breakable cast consumers' yard stocks are getting down to the must buy stage.

•

PHILADELPHIA—Mills were not in the market due to the holiday at the beginning of the week, but are expected to start buying quickly after being out at the end of the month. Although there were no price changes, there were indications in some quarters that last quotations were remaining strong this week. Shipments continued to be good.

•

NEW YORK—Principal brokers' buying prices are again unchanged for the week. A few factors are paying a bit more than $32 a ton for occasional cars but not in enough volume to make a market. Many of these old orders will be cleaned up late this week and by the middle of the month there will be practically none of the old higher priced orders left on any broker's books. By this time some price testing is anticipated by the trade.

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DETROIT—Despite the sharp curtailment in auto production because of the steel shortage, the Murray strike and plant walkouts during the hot weather, the flow of industrial scrap in Detroit held at surprisingly high levels during August. Dealers report considerable pressure is being exerted to keep scrap prices at present or lower levels although it is not expected that large Detroit mill buyers will be in the market for open-hearth grades again until Sept. 15 when present contracts expire. Meanwhile, there are indications that pressure by competitive buyers may force the price of low phos plate to higher levels. The market for cast iron grades continues strong but unchanged in price.

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BUFFALO—Heavy melting steel and bundles dropped $1.50 to $2 a ton during the past week as one of the leading consumers bought a good sized tonnage at its own price of $37 to $38. At the same time another mill held up shipments of high cost scrap when rush of deliveries brought the threat of a rail embargo at the plant. The latest mill purchases represented a $5 decline from the high water mark established a month ago. Turnings and borings were not included in the new orders and prices of these items were lowered $1 in sympathy. Cast grades remained firm.

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ST. LOUIS—Activities of brokers in the St. Louis market are centered in making shipments to the mills before the expiration of outstanding contracts on Sept. 5. Shipments are being maintained but it is uncertain whether all contracts will be filled and also as to whether the mills will extend the time for delivery.

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BIRMINGHAM—A drop of $4 per ton in the price of heavy melting steel here since the middle of August has reduced sharply the amount of material being offered for sale in this market. Both mills and foundries, however, are in a fairly good position from a scrap inventory standpoint.

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TORONTO—Conditions remained virtually unchanged in the Canadian scrap markets during the past with hot weather and the Labor Day week-end sharing credit for the general listlessness. Dealers have hopes that there will soon be an improvement in receipts and they look for fairly large tonnages from the farming communities. The advance in cast iron scrap prices has so far had little effect in increasing supplies. Steelmaking scrap is in limited supply and steel producers are depending more on importations than on domestic sources.

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$37.50 to $38.00
RR. hvy. melting	41.00 to 42.00
No. 2 hvy. melting	37.50 to 38.00
RR. scrap rails	45.50 to 46.00
Rails 2 ft. and under	49.00 to 49.50
No. 1 comp'd bundles	37.50 to 38.00
Hand bdld. new shts.	37.50 to 38.00
Hvy. axle turn.	36.00 to 37.00
Hvy. steel forge turn.	36.00 to 37.00
Mach. shop turn.	32.50 to 33.00
Shoveling turn.	34.50 to 35.00
Mixed bor. and turn.	32.50 to 33.00
Cast iron borings	33.50 to 34.00
No. 1 cupola cast	42.00 to 43.00
Hvy. breakable cast	37.00 to 37.50
Malleable	52.00 to 53.00
RR. knuck and coup.	47.50 to 48.00
RR. coil springs	47.50 to 48.00
RR. leaf springs	47.50 to 48.00
Rolled steel wheels	47.50 to 48.00
Low phos.	45.00 to 45.50

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$38.50 to $39.00
No. 2 hvy. melting	38.50 to 39.00
No. 1 bundles	38.50 to 39.00
No. 2 dealers' bundles	38.50 to 39.00
Bundled mach. shop turn.	38.50 to 39.00
Galv. bundles	36.50 to 37.00
Mach. shop turn.	33.50 to 34.00
Short shov. turn.	35.50 to 36.00
Cast iron borings	34.50 to 35.00
Mix. borings & turn.	33.50 to 34.00
Low phos, hvy. forge.	45.00 to 46.00
Low phos, plates	42.00 to 42.50
No. 1 RR. hvy. melt.	43.75 to 44.25
Rerolling rails	48.00 to 49.00
Miscellaneous rails	44.00 to 45.00
Angles & splice bars	47.00 to 47.50
Locomotive tires, cut	43.00 to 43.50
Cut bolster & side frames	45.00 to 46.00
Standard stl. car axles	49.00 to 50.00
No. 3 steel wheels	45.00 to 46.00
Couplers & knuckles	45.50 to 46.00
Rails 2 ft. and under	48.50 to 49.50
Malleable	61.00 to 62.00
No. 1 mach. cast.	49.00 to 50.00
No. 1 agricul. cast.	44.00 to 46.00
Hvy. breakable cast.	40.00 to 41.00
RR. grate bars	42.00 to 42.50
Cast iron brake shoes	44.00 to 44.50
Cast iron carwheels	42.50 to 43.50

CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	38.00 to 39.00
No. 1 bundles	**38.00 to 39.00**
No. 2 bundles	38.00 to 39.00
Mach. shop turn.	28.50 to 29.00
Shoveling turn.	30.50 to 31.00
Cast iron borings	28.50 to 29.00
Mixed bor. & turn.	28.00 to 29.00
Low phos. plate	39.00 to 40.00
No. 1 cupola cast	**44.00 to 45.00**
Hvy. breakable cast.	35.00 to 36.00
Scrap rails	39.00 to 40.00

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars:

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	30.00 to 31.00
Nos. 1 and 2 bundles	30.00 to 31.00
Busheling	30.00 to 31.00
Shoveling turn.	27.00 ...
Machine shop turn.	25.50 to 26.00
Mixed bor. & turn.	25.50 to 26.00
Cl'n cast. chem. bor.	26.50 to 27.00
No. 1 machinery cast.	39.00 to 41.00
No. 2 machinery cast.	37.00 to 39.00
Heavy breakable cast.	35.50 to 37.00

DETROIT

Per gross ton, brokers' buying prices, f.o.b. cars:

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 bundles	34.00 to 35.00
New busheling	34.00 to 35.00
Flashings	34.00 to 35.00
Mach. shop turn.	27.00 to 28.00
Shoveling turn.	28.00 to 29.00
Cast iron borings	28.00 to 29.00
Mixed bor. & turn.	28.00 to 29.00
Low phos. plate	37.00 to 38.00
No. 1 cupola cast.	38.00 to 39.00
Hvy. breakable cast.	31.00 to 32.00
Stove plate	**32.00 to 34.00**
Automotive cast.	**38.00 to 40.00**

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$36.50 to $37.50
No. 2 hvy. melting	36.50 to 37.50
No. 1 bundles	36.50 to 37.50
No. 2 bundles	36.50 to 37.50
Mach. shop turn.	28.50 to 29.50
Shoveling turn.	28.50 to 29.50
Mixed bor. & turn.	28.50 to 29.50
Clean cast chemical bor.	32.00 to 33.00
No. 1 cupola cast.	46.50 to 47.50
Hvy. breakable cast.	43.50 to 44.50
Cast. charging box.	43.50 to 44.50
Clean auto cast.	46.50 to 47.50
Hvy. axle forge turn.	36.50 to 37.50
Low phos. plate	40.00 to 41.00
Low phos. punchings	40.00 to 41.00
Low phos. bundles	39.00 to 40.00
RR. steel wheels	44.00 to 45.00
RR. coil springs	44.00 to 45.00
RR. malleable	58.00 to 60.00

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy. melting	$39.50 to $40.50
No. 2 hvy. melting	38.50 to 39.50
Bundled sheets	38.50 to 39.50
Mach. shop turn.	31.25 to 32.25
Locomotive tires, uncut	41.00 to 42.00
Mis. std. sec. rails	42.00 to 43.00
Rerolling rails	45.00 to 46.00
Steel angle bars	42.50 to 43.50
Rails 3 ft. and under	45.00 to 46.00
RR. steel springs	45.00 to 46.00
Steel car axles	43.00 to 44.00
Grate bars	36.00 to 37.00
Brake shoes	38.00 to 39.00
Malleable	**58.00 to 60.00**
Cast iron car wheels	42.00 to 43.00
No. 1 machinery cast	**43.00 to 44.00**
Hvy. breakable cast.	38.00 to 39.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	34.00 to 35.00
No. 2 bundles	34.00 to 35.00
No. 1 busheling	34.00 to 35.00
Long turnings	23.00 to 24.00
Shoveling turnings	**25.00 to 26.00**
Cast iron borings	24.00 to 25.00
Bar crops and plate	38.00 to 38.50
Structural and plate	38.00 to 38.50
No. 1 cupola cast.	44.00 to 45.00
Stove plate	42.00 to 42.50
No. 1 RR. hvy. melt.	36.00 to 37.00
Steel axles	38.00 to 39.00
Scrap rails	37.50 to 38.00
Rerolling rails	38.50 to 39.00
Angles & splice bars	38.50 to 39.00
Rails 3 ft. & under	38.50 to 39.00
Cast iron carwheels	**35.00 to 36.00**

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$39.50 to $40.00
No. 2 hvy. melting	39.50 to 40.00
Mach. shop turn.	**33.00 to 34.00**
Short shov. turn.	**34.00 to 35.00**
Cast iron borings	33.00 to 34.00
Low phos.	44.00 to 45.00

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$32.00
No. 2 hvy. melting	32.00
No. 2 bundles	32.00
Comp. galv. bundles	30.00
Mach. shop turn.	25.00 to 26.00
Mixed bor. & turn.	25.00 to 26.00
Shoveling turn.	27.00 to 28.00
No. 1 cupola cast.	39.00 to 40.00
Hvy. breakable Cast.	39.00 to 40.00
Charging box cast.	39.00 to 40.00
Stove plate	39.00 to 40.00
Clean auto cast.	39.00 to 40.00
Unstrip. motor blks.	36.50 to 37.50
Cl'n chem. cast bor.	27.00 to 28.00

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 bundles	37.00 to 38.00
No. 2 bundles	37.00 to 38.00
No. 1 busheling	37.00 to 38.00
Mach. shop turn.	29.00 to 30.00
Shoveling turn.	31.00 to 32.00
Cast iron borings	29.00 to 30.00
Mixed bor. & turn.	29.00 to 30.00
No. 1 cupola cast.	40.00 to 42.00
Charging box cast.	36.00 to 38.00
Stove plate	39.00 to 40.00
Clean auto cast.	40.00 to 42.00
Small indl. malleable	39.00 to 41.00
RR. malleable	46.00 to 52.00
Low phos. plate	40.00 to 41.00
Scrap rails	40.00 to 41.00
Rails 3 ft. & under	44.00 to 45.00
RR. steel wheels	42.00 to 43.00
Cast iron carwheels	42.00 to 43.00
RR. coil & leaf spgs.	42.00 to 43.00
RR. knuckles & coup.	42.00 to 43.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$38.00 to $38.50
No. 2 hvy. melting	38.00 to 38.50
No. 1 bundles	38.00 to 38.50
No. 2 bundles	38.00 to 38.50
No. 1 busheling	38.00 to 38.50
Drop forge flashings	38.00 to 38.50
Mach. shop turn.	31.50 to 32.00
Shoveling turn.	32.50 to 33.00
Steel axle turn.	38.00 to 38.50
Cast iron borings	32.50 to 33.00
Mixed bor. & turn.	32.50 to 33.00
Low phos.	41.00 to 42.00
No. 1 machinery cast.	47.00 to 47.50
Malleable	54.00 to 55.00
RR. Cast.	47.00 to 47.50
Railroad grate bars	42.00 to 44.00
Stove plate	**42.00 to 44.00**
RR. hvy. melting	40.50 to 41.00
Rails 3 ft. & under	47.00 to 48.00
Rails 18 in. & under	48.00 to 49.00

SAN FRANCISCO

Per gross ton f.o.b. shipping point

No. 1 hvy. melting	$22.00
No. 2 hvy. melting	22.00
No. 2 bales	22.00

Per gross ton delivered to consumer

No. 3 bales	$16.50
Mach. shop turn.	13.00
Elec. furn. 1 ft. und.	26.00
No. 1 cupola cast.	$32.00 to 33.00
RR. hvy. melting	23.00

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	$22.50
No. 2 hvy. melting	22.50
No. 1 bales	22.50
No. 2 bales	22.50
No. 3 bales	16.00
Mach. shop turn.	14.50
No. 1 cupola cast.	$32.00 to 33.00
RR. hvy. melting	23.00

SEATTLE

Per gross ton delivered to consumer:

No. 1 & No. hvy. melt.	$20.00 to $22.00
Elec. furn. 1 ft. und.	$25.50 to 27.00
No. 1 cupola cast.	29.00
RR. hvy. melting	23.00

HAMILTON, ONT.

Per gross ton delivered to consumer: Cast grades f.o.b. shipping point

Heavy melting	$17.50*
No. 1 bundles	17.50*
No. 2 bundles	17.00*
Mixed steel scap	15.50*
Rails, remelting	18.50*
Rails, rerolling	21.50*
Bushelings	13.00*
Mixed borings & turnings	12.50*
Electric furnace bundles	20.50*
Manganese steel scrap	20.00*
No. 1 cast.	32.00 to 33.00*
Stove plate	17.50*
Car wheels, cast	19.50*
Malleable iron	16.00*

* Ceiling price.

Comparison of Prices . .

Advances over past week in Heavy Type, declines in *Italics*. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.

Flat-Rolled Steel: (cents per pound)	Sept. 2, 1947	Aug. 26, 1947	Aug. 5, 1947	Sept. 3, 1946
Hot-rolled sheets	2.80	2.80	2.80	2.425
Cold-rolled sheets	3.55	3.55	3.55	3.275
Galvanized sheets (10 ga.)	3.95	3.95	3.95	4.05*
Hot-rolled strip	2.80	2.80	2.80	2.45
Cold-rolled strip	3.55	3.55	3.55	3.05
Plates	2.95	2.95	2.95	2.50
Plates wrought iron	6.85	6.85	6.85	4.112
Stain's c-r strip (No. 302)	30.30	30.30	30.30	30.30
*24 ga				
Tin and Terneplate: (dollars per base box)				
Tinplate, standard cokes	$5.75	$5.75	$5.75	$5.00
Tinplate, electro (0.50 lb)	5.05	5.05	5.05	4.50
Special coated mfg. ternes	4.90	4.90	4.90	4.30
Bars and Shapes: (cents per pound)				
Merchant bars	2.90	2.90	2.90	2.50
Cold-finished bars	3.55	3.55	3.55	3.10
Alloy bars	3.30	3.30	3.30	2.92
Structural shapes	2.80	2.80	2.80	2.35
Stainless bars (No. 302)	26.00	26.00	26.00	25.97
Wrought iron bars	7.15	7.15	7.15	4.76
Wire and Wire Products: (cents per pound)				
Bright wire	3.55	3.55	3.55	3.05
Wire nails	4.25	4.25	4.25	3.75
Rails: (dollars per 100 lb)				
Heavy rails	$2.50	$2.50	$2.75	$43.39*
Light rails	2.85	2.85	2.85	49.18*
*per net ton				
Semifinished Steel: (dollars per gross ton)				
Rerolling billets	$45.00	$45.00	$45.00	$39.00
Sheet bars	66.00	66.00	59.00	38.00
Slabs, rerolling	45.00	45.00	45.00	39.00
Forging Billets	55.00	55.00	55.00	47.00
Alloy blooms, billets, slabs	66.00	66.00	66.00	58.43
Wire Rods and Skelp: (cents per pound)				
Wire rods	2.80	2.80	2.80	2.30
Skelp	2.60	2.60	2.60	2.05

Pig Iron: (per gross ton)	Sept. 2, 1947	Aug. 26, 1947	Aug. 5, 1947	Sept. 3, 1946
No. 2, foundry, Phila.	$41.22	$41.22	$40.39	$30.43
No. 2, Valley furnace	36.50	36.50	36.50	28.50
No. 2, Southern Cin'ti	39.75	39.75	38.25	27.80
No. 2, Birmingham	34.88	34.88	33.38	24.88
No. 2, foundry, Chicago†	36.00	36.00	36.00	28.50
Basic del'd Philadelphia	40.72	40.72	39.89	29.93
Basic, Valley furnace	36.00	36.00	36.00	28.00
Malleable, Chicago†	36.50	36.50	36.50	28.50
Malleable, Valley	36.50	36.50	36.50	28.50
Charcoal, Chicago	49.49	49.49	49.49	42.34
Ferromanganese‡	135.00	135.00	135.00	135.00

† The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡ For carlots at seaboard.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	$37.75	$37.75	$42.75	$20.00
Heavy melt'g steel, Phila.	37.00	37.00	40.50	18.75
Heavy melt'g steel, Ch'go	38.75	38.75	41.75	18.75
No. 1, hy. comp. sheet, Det.	34.50	34.50	37.50	17.32
Low phos. Youngs'n	44.50	44.50	46.50	22.50
No. 1, cast, Pittsburgh	42.50	42.50	41.50	20.00
No. 1, cast, Philadelphia	47.00	47.00	48.50	20.00
No. 1, cast, Chicago	49.50	47.50	51.25	20.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$12.00	$12.00	$12.00	$8.75
Foundry coke, prompt	13.75	13.75	13.75	8.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro., Conn.	21.50	21.50	21.50	14.375
Copper, Lake, Conn.	21.625	21.625	21.625	14.375
Tin, Straits, New York	80.00	80.00	80.00	52.00
Zinc, East St. Louis	10.50	10.50	10.50	8.25
Lead, St. Louis	14.80	14.80	14.80	8.10
Aluminum, virgin	15.00	15.00	15.00	15.00
Nickel, electrolytic	37.67	37.67	37.67	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	33.00	33.00	33.00	14.50

Composite Prices . .

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942, and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite price for the current quarter is an estimate based on finished steel shipments for the previous quarter. This figure will be revised when shipments for this quarter are compiled.

	FINISHED STEEL	PIG IRON	SCRAP STEEL
Sept. 2, 1947	3.19141¢ per lb.	$37.10 per gross ton	$37.83 per gross ton
One week ago	3.19141¢ per lb.	$37.10 per gross ton	$37.83 per gross ton
One month ago	3.19141¢ per lb.	$36.38 per gross ton	$41.67 per gross ton
One year ago	2.70711¢ per lb.	$28.13 per gross ton	$19.17 per gross ton

	FINISHED STEEL HIGH	FINISHED STEEL LOW	PIG IRON HIGH	PIG IRON LOW	SCRAP STEEL HIGH	SCRAP STEEL LOW
1947	3.19141¢ Aug. 5	2.87118¢ Jan. 7	$37.35 Aug. 19	$30.14 Jan. 7	$41.67 Aug. 5	$29.50 May 20
1946	2.83599¢ Dec. 31	2.54490¢ Jan. 1	30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan. 1
1945	2.44104¢ Oct. 2	2.38444¢ Jan. 2	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 22
1944	2.30837¢ Sept. 5	2.21189¢ Oct. 5	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.29176¢	2.29176¢	23.61	23.61	$19.17	$19.17
1942	2.28249¢	2.28249¢	23.61	23.61	19.17	19.17
1941	2.43078¢	2.43078¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	23.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1935	2.07642¢ Oct. 1	2.06492¢ Jan. 8	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1934	2.15367¢ Apr. 24	1.95757¢ Jan. 2	17.90 May 1	16.90 Jan. 27	13.00 Mar. 13	9.50 Sept. 25
1933	1.95578¢ Oct. 3	1.75836¢ May 2	16.90 Dec. 5	13.56 Jan. 3	12.25 Aug. 8	6.75 Jan. 3
1932	1.89196¢ July 5	1.83901¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1931	1.99626¢ Jan. 13	1.86586¢ Dec. 29	15.90 Jan. 6	14.79 Dec. 15	11.33 Jan. 6	8.50 Dec. 29
1930	2.25488¢ Jan. 7	1.97319¢ Dec. 9	18.21 Jan. 7	15.90 Dec. 16	15.00 Feb. 18	11.25 Dec. 9
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 8

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. basing points in cents per pound or dollars per gross ton. Extras apply. Delivered prices do not reflect 3 pct tax on freight. Industry practice has discontinued arbitrary f.o.b. prices at Gulf and Pacific Ports. Space limitations prevent quotation of delivered prices at major ports. (1) Commercial quality sheet grade; primes, 25c above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producers to fabricators. (8) Also shafting. For quantities of 20,000 lb to 89,999 lb. (9) Carload lot in manufacturing trade. (10) Delivered Los Angeles only. (11) Boxed. (12) Produced to dimensional tolerances in AISI Manual Sec. 6. (13) Delivered San Francisco only: Includes 3 pct freight tax. (14) Delivered Kaiser Co. prices: includes 3 pct freight tax. (15) to 0.035 to 0.075 in. thick by ¾ to 3½ in. wide. (16) Spot market as high as $92 gross ton. (17) Delivered Los Angeles: add ½c per 100 lb for San Francisco. (18) Slab prices subject to negotiation in most cases. Some producers charge (19) $5 more, (20) $3 more, (21) $1 more. Some producers charge (22) 0.05¢ less, (23) 0.10¢ less, (24) 0.20¢ less.

Basing Points	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio		San Franc'co, Los Angeles, Seattle	DELIVERED TO Detroit	New York	Philadelphia
INGOTS															
Carbon, rerolling	($36.00 f. o. b. mill) (Spot market as high as $80 gross ton)														
Carbon, forging	$46.00														
Alloy	$56.00						(Canton = $56.00)								
BILLETS, BLOOMS, SLABS															
Carbon, rerolling [18]	$45.00[19]	$45.00[19]	$45.00[19]	$47.00	$45.00[19]	$45.00[19]	$50.00						$48.00[19]		
Carbon, forging billets	$55.00[20]	$55.00[20]	$55.00[20]	$55.00	$55.00[20]	$55.00[20]	$58.00		(Duluth = $57.00)				$58.00[20]		
Alloy	$66.00	$66.00				$66.00	(Bethlehem, Massillon, Canton = $66.00)						$69.00		
SHEET BARS[16]							$66.00								
PIPE SKELP	2.60¢[21]	2.65¢					2.60¢[21]	2.60¢[21]							
WIRE RODS	2.80¢[21]	2.80¢[21]		2.80¢[21]	2.85¢		(Worcester = 2.90¢[21])					3.52¢[13]			
SHEETS															
Hot-rolled	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢	3.175¢	(Ashland, Ky. = 2.80¢)		3.54[17]¢	2.95¢	3.09¢	3.00¢
Cold-rolled[1]	3.55¢	3.55¢	3.55¢	3.55¢		3.55¢	3.55¢		3.65¢	3.55¢			3.70¢	3.96¢	3.93¢
Galvanized (10 gage)	3.95¢[23]	3.95¢[23]	3.95¢[23]		3.95¢[23]		3.95¢	3.95¢	4.05¢	3.95¢		4.62¢[17]		4.14¢	4.05¢
Enameling (12 gage)	3.95¢[22]	3.95¢[22]	3.95¢[22]	3.95¢			3.95¢		4.05¢	3.95¢			4.10¢[22]	4.35¢	4.33¢
Long ternes [2] (10 gage)	4.05¢[24]	4.05¢	4.05¢[24]											4.45¢	4.41¢
STRIP															
Hot-rolled [3]	2.80¢	2.80¢	2.80¢	2.80¢[15]	2.80¢		2.80¢					3.60¢[17]	2.95¢	3.23¢	3.18¢
Cold-rolled [4]	3.55¢	3.65¢		3.55¢			3.55¢			(Worcester = 3.75¢)			3.70¢	3.96¢	3.93¢
Cooperage stock	3.10¢	3.10¢			3.10¢		3.10¢							3.39¢	
TINPLATE															
Standard cokes, base box	$5.75	$5.75	$5.75		$5.85			$5.85	$5.85		(Warren, Ohio = $5.75)			$8.175	$8.062[11]
Electro, box 0.25 lb.	Deduct 90¢ from standard coke base box price.														
Electro, box 0.50 lb.	Deduct 70¢ from standard coke base box price.														
Electro, box 0.75 lb.	Deduct 50¢ from standard coke base box price.														
BLACKPLATE, 29 gage[5]	3.90¢	3.90¢	3.90¢		4.00¢			4.00¢	4.00¢					4.29¢	4.20¢
BLACKPLATE, CANMAKING															
55 lb. to 70 lb.	Deduct $1.55 from standard coke base box.														
75 lb. to 95 lb.	Deduct $1.65 from standard coke base box.														
100 lb. to 118 lb.	Deduct $1.55 from standard coke base box.														
TERNES, MFG., Special coated	Deduct 85¢ from standard coke base box price.														
BARS															
Carbon steel	2.90¢	2.90¢	2.90¢	2.90¢	2.90¢	2.90¢	2.90¢					3.625¢[17]	3.05¢	3.31¢	3.28¢
Rail steel[6]	Subject to negotiation because of fluctuating scrap prices.														
Reinforcing (billet)[7]	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢				3.325¢[17]		3.04¢	2.95¢
Reinforcing (rail)	Subject to negotiation because of fluctuating scrap prices.														
Cold-finished[8]	3.55¢	3.55¢	3.55¢	3.55¢		3.55¢							3.70¢	3.96¢	3.93¢
Alloy, hot-rolled	3.30¢	3.30¢				3.30¢	3.30¢	(Bethlehem, Massillon, Canton = 3.30¢)					3.45¢		3.44¢
Alloy, cold-drawn	4.10¢	4.10¢	4.10¢	4.10¢		4.10¢							4.25¢		
PLATE								(Coatesville = 3.15¢, Claymont = 3.15¢, Geneva, Utah = 3.125¢)							
Carbon steel[12]	2.95¢	2.95¢	2.95¢	2.95¢	2.95¢		2.95¢	2.95¢				3.76¢[14]		3.17¢	3.15¢
Floor plates	4.20¢	4.20¢												4.60¢	4.58¢
Alloy	3.80¢	3.80¢			(Coatesville = 4.50¢)									4.02¢	3.895¢
SHAPES, Structural	2.80¢	2.80¢	2.80¢		2.80¢	2.80¢	(Geneva, Utah = 2.975¢, Bethlehem = 2.80¢)					3.43¢[10]		3.00¢	2.94¢
SPRING STEEL, C-R															
0.26 to 0.40 carbon	3.20¢			3.20¢			(Worcester = 3.48¢)								
0.41 to 0.60 carbon	4.70¢			4.70¢			(Worcester = 4.99¢)								
0.61 to 0.80 carbon	5.30¢			5.30¢			(Worcester = 5.50¢)								
0.81 to 1.00 carbon	6.80¢			6.80¢			(Worcester = 7.00¢)								
Over 1.00 carbon	9.10¢			9.10¢			(Worcester = 9.30¢)								
MANUFACTURERS' WIRE[9]															
Bright	3.55¢	3.55¢		3.55¢	3.55¢		(Worcester = 3.65¢, Duluth = 3.60¢)					4.56¢[13]		3.96¢	3.93¢
Galvanized	Add proper size extra and galvanizing extra to Bright Wire Base														
Spring (high carbon)	4.60¢	4.60¢		4.60¢	(Worcester = 4.70¢, Duluth = 4.85¢) (Trenton = 4.85¢)							5.28¢[13]		4.66¢	4.595¢
PILING, Steel sheet	3.30¢	3.30¢				3.30¢								3.71¢	3.68¢

CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. basing point

Basing Point	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 446
Ingot, P'gh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila	Subject to negotiation			Subject to negotiation		
Blooms, P'gh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt	Subject to negotiation			Subject to negotiation		
Slabs, P'gh, Chi, Canton, Balt, Phila, Reading	Subject to negotiation			Subject to negotiation		
Billets, P'gh, Chi, Canton, Watervliet, Syracuse, Balt	Subject to negotiation			Subject to negotiation		
Billets, forging, P'gh, Chi, Canton, Dunkirk, Balt, Phila, Reading, Water, Syracuse, Ft. Wayne, Titusville	23.00	22.50	17.50	17.50	21.00	25.50
Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville	27.50	26.00	20.50	21.00	24.50	30.00
Bars, c-f, P'gh, Chi, Cleve Canton, Dunkirk, Syracuse, Balt, Phila, Reading, Ft. Wayne, Watervliet	27.50	26.00	20.50	21.00	24.50	30.00
Plates, P'gh, Middletown, Canton	31.50	29.50	23.50	24.00	28.00	33.00
Shapes, structural, P'gh, Chi	27.50	26.00	20.50	21.00	24.50	30.00
Sheets, P'gh, Chi, Middletown, Canton, Balt	39.00	37.00	29.00	31.50	35.50	39.50
Strip, h-r, P'gh, Chi, Reading, Canton, Youngstown	25.50	23.50	18.50	19.00	26.00	38.00
Strip, c-r, P'gh, Cleve, Newark, N. J., Reading, Canton, Youngstown	32.50	30.50	24.00	24.50	35.00	56.50
Wire, c-d, Cleve, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J., Phila, Ft. Wayne	27.50	26.00	20.50	21.00	24.50	30.00
Wire, flat, c-r, Cleve, Balt, Reading, Dunkirk, Canton	32.46	30.30	23.80	24.34	34.62	56.26
Rod, h-r, Syracuse	27.05	25.97	20.02	20.56	24.34	29.75
Tubing, seamless, P'gh, Chi, Canton (4 to 6 in.)	72.09	72.09	.....	68.49	.....	.....

TOOL STEEL

*(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk. *Also Canton, Ohio)*

W	Cr	V	Mo	Co	Base Per lb
18	4	1	—	—	82¢
18	4	1	—	5	$1.29
18	4	2	—	—	93¢
1.5	4	1.5	8	—	59¢
6	4	2	6	—	63¢

High-carbon-chromium* ..... 47¢
Oil hardening manganese* ..... 26¢
Special carbon* ..... 24¢
Extra carbon* ..... 20¢
Regular carbon* ..... 17¢

Warehouse prices on and east of Mississippi are 2¢ per lb. higher; west of Mississippi, 4¢ higher.

ELECTRICAL SHEETS

Base, all grades f.o.b. Pittsburgh

	Per lb
Field grade	4.50¢
Armature	4.80¢
Electrical	5.30¢
Motor	6.05¢
Dynamo	6.75¢
Transformer 72	7.25¢
Transformer 65	7.95¢
Transformer 58	8.65¢
Transformer 52	9.45¢

F.o.b. Chicago and Gary, field grade through motor; f.o.b. Granite City, add 10¢ per 100 lb on field grade to and including dynamo.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, heavier than 60 lb
No. 1 O.H., per 100 lb $2.75
Angle splice bars, 100 lb 3.25

(F.o.b. basing points) *per 100 lb*
Light rails (from billets) $3.10
Light rails (from rail steel), f.o.b. Williamsport, Pa. 3.45

	Base per lb
Cut spikes	4.85¢
Screw spikes	6.90¢
Tie plate, steel	3.05¢
Tie plates, Fittsburg, Calif.	3.20¢
Track bolts	7.00¢
Track bolts, heat treated, to rail roads	7.25¢

Basing points, light rails, Pittsburgh, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio; Weirton, W. Va.; St. Louis, Kansas City, Minnequa, Colo.; Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa.; Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa.; Richmond.

ROOFING TERNEPLATE

(F.o.b. Pittsburgh, 112 sheets)

	20x14 in.	20x28 in.
8-lb coating I.C.	$7.05	$14.10

CLAD STEEL

Base prices, cents per pound

Stainless-clad	Plate	Sheet
No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Coatesville, Pa.	*24.00	*22.00
Nickel-clad 10 pct, f.o.b. Coatesville, Pa.	21.50	....
Inconel-clad 10 pct, f.o.b. Coatesville	30.00	....
Monel-clad 10 pct, f.o.b. Coatesville	29.00	....
Aluminized steel Hot dip, 20 gage, f.o.b. Pittsburgh	....	9.00

* Includes annealing and pickling, or sandblasting.

MERCHANT WIRE PRODUCTS

To the dealer f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Base per keg	Delivered San Francisco
Standard & coated nails	$4.25†	$5.33
Galvanized nails‡‡	4.00†	5.08
Cut nails, carloads, Pittsburgh base	5.80*	....

† 10¢ additional at Cleveland, 35¢ at Worcester. ‡‡ Plus $2.75 per 100 lb galvanizing extra. *Less 20¢ to jobbers.

	Base per 100 lb	
Annealed fence wire	$4.20‡	$5.21
Annealed galv. fence wire	4.65‡	5.66

‡10¢ additional at Worcester.

To the dealer f.o.b. Pittsburgh, Chicago, Birmingham

	Base	column
Woven wire fence*	91	114
Fence posts, carloads	90††	...
Single loop bale ties	91	115
Galvanized barbed wire**	101	121
Twisted barbless wire	101	...

* 15½ gage and heavier. ** On 80-rod spools in carload quantities. ††Pittsburgh, Duluth.

HIGH STRENGTH, LOW ALLOY STEELS

base prices, cents per pound

Steel	Alde-cor	Corten	Double Strength No. 1	Dyn-alloy	HI Steel	Mayari R	Otis-coloy	Yoloy	NAX High Tensile
Producer	Republic	Carnegie-Illinois, Republic	Republic	Alan Wood	Inland	Bethlehem	Jones & Laughlin	Youngstown Sheet & Tube	Great Lakes Steel
Plates	4.55	4.55	4.55	4.55	4.55	4.55	4.55	4.55	4.55
Sheets									
Hot-rolled	4.30	4.30	4.30	4.30	4.30	4.30	4.30	4.30	4.30
Cold-rolled	5.30	5.30	5.30	....	5.30	5.30	5.30	5.30	5.30
Galvanized	....	5.85	....	....	....	6.00	....	....	....
Strip									
Hot-rolled	4.30	4.30	4.30	....	4.30	4.30	4.30	4.30	4.30
Cold-rolled	....	....	5.30	....	....	5.30	5.30	5.30	5.30†
Shapes	....	4.30	....	....	4.30	4.30	4.30	4.30	....
Beams	....	4.30	....	....	....	4.30	....	....	....
Bars									
Hot-rolled	4.45	4.45	4.45	....	....	4.45	4.45	4.45	4.45
Cold-rolled	....	....	....	....	....	....	....	....	....
Bar shapes	....	4.45	....	....	4.45	4.45	4.45	4.45	....

† Pittsburgh, add 0.10¢ at Chicago and Gary.

PIPE AND TUBING

Base discounts. f.o.b. Pittsburgh and Lorain, steel buttweld and seamless. Others f.o.b. Pittsburgh only
Base price, $200.00 per net ton

Standard, threaded & coupled

Steel, buttweld	Black	Galv.
½-in.	50½	34½
¾-in.	53½	38½
1-in.	56	41½
1¼-in.	56½	42
1½-in.	57	42½
2 in.	57½	43
2½ and 3-in.	58	43½
Wrought Iron, buttweld		
½-in.	+7	+29
¾-in.	2½	+19
1 and 1¼-in.	8	+11
1½-in.	13½	+7½
2-in.	14	+7
Steel, lapweld		
2-in.	49	34
2½ and 3-in.	52	37
3½ to 6-in.	54	39
Steel, seamless		
2-in.	48	33
2½ and 3-in.	51	36
3½ to 6-in.	53	38
Wrought Iron, lapweld		
2-in.	5½	+14½
2½ to 3½-in.	8	+10½
4-in.	12	+5
4½ to 8-in.	10	+6½

Extra Strong, plain ends

Steel, buttweld		
½-in.	49½	35
¾-in.	53½	39
1-in.	55½	42
1¼-in.	56	42½
1½-in.	56½	43
2-in.	57	43½
2½ and 3-in.	57½	44
Wrought Iron, buttweld		
½-in.	+2½	+23
¾-in.	3½	+17
1 to 2-in.	13	+7
Steel, lapweld		
2-in.	48	34
2½ and 3-in.	52	38
3½ to 6-in.	55½	41½
Steel, seamless		
2-in.	47	33
2½ and 3-in.	51	37
3½ to 6-in.	52½	40½
Wrought Iron, lapweld		
2-in.	8½	+11
2½ to 4-in.	17½	+½
4½ to 6-in.	13	+5

Basing discounts for standard pipe are for threads and couplings. For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. F.o.b. Gary prices are one point lower discount on all buttweld. On buttweld and lapweld steel pipe, jobbers are granted a discount of 5 pct. On l.c.l. shipments, prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft, f.o.b. Pittsburgh in carload lots, cut length 4 to 24 ft, inclusive.

OD	Gage	Seamless		Electric Weld	
in.	BWG	Hot-Rolled	Cold-Drawn	Hot-Rolled	Cold-Drawn
2	13	$16.67	$19.99	$16.17	$19.39
2½	12	22.42	26.87	21.75	26.06
3	12	24.93	29.90	24.18	29.00
3½	11	31.17	37.39	30.23	36.27
4	10	38.69	46.38	37.53	44.99

CAST IRON WATER PIPE

Per net ton

6-in. to 24-in. del'd Chicago $85.06
6-in. to 24-in. del'd New York..... 83.30
6-in. to 24-in., Birmingham 74.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles for all rail shipment; rail and water shipment less 98.50
Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

Base discount less case lots

	Percent Off List
½ in. & smaller x 6 in. & shorter..	48
9/16 & ⅝ in. x 6 in. & shorter....	50
All larger diam and longer lengths..	47
Lag, all diam over 6 in. long.....	48
Lag, all diam x 6 in. & shorter....	50
Plow bolts	57

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller	48
9/16 to 1 in. inclusive	47
1⅛ to 1½ in. inclusive	45
1⅝ in. and larger	40

On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifin. Hexagon Nuts	USS	SAE
Base discount less case lots		
7/16 in. and smaller		51
½ in. and smaller	50	..
½ in. through 1 in.		48
9/16 in. through 1 in. ...	49	..
1⅛ in. through 1½ in. ...	47	46
1⅝ in. and larger	40	..

In full case lots, 15 pct additional discount. For 200 lb or more, freight allowed up to 50¢ per 100 lb, based on Cleveland, Chicago, Pittsburgh.

Stove Bolts	*Consumer*
Packages, nuts separate	65 and 10
In bulk	75

On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.

Large Rivets (½ in. and larger)	*Base per 100 lb*
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$5.25
F.o.b. Lebanon, Pa.	5.40

Small Rivets (7/16 in. and smaller)	*Percent Off List*
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	55 and 5

Cap and Set Screws (In packages)	*Percent Off List Consumer*
Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright.....	56
¾ to 1 in. x 6 in., SAE 1035, heat treated	47
Set screws, cup and oval points.....	61
Milled studs	33
Flat head cap screws, listed sizes....	21
Fillister head cap, listed sizes	40

Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.

FLUORSPAR

Metallurgical grade, f.o.b. producing plant.

Effective CaF_2 Content:	*Base price per short ton*
70% or more	$33.00
65% but less than 70%	32.00
60% but less than 65%	31.00
Less than 60%	30.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

	Per Gross Ton
Old range, bessemer	$5.95
Old range, nonbessemer	5.80
Mesabi, bessemer	5.70
Mesabi, nonbessemer	5.55
High phosphorus	5.55

Prices quoted retroactive to Jan. 1, 1947.

METAL POWDERS

Prices in cents per pound in ton lots, f.o.b. shipping point.

Brass, minus 100 mesh.....24¢ to 28½¢
Copper, electrolytic, 100 and 325 mesh .....30¢ to 31½¢
Copper, reduced, 150 and 200 mesh .....29¢ to 30½¢
Iron, commercial, 100, 200, 325, mesh 96 + % Fe carlots....10¢ to 17¢
Swedish sponge iron, 100 mesh, c.l.f. N. Y., carlots, ocean bags..7.4¢ to 8.5¢
Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots ..... 5¢
Iron, hydrogen reduced, 300 mesh and finer, 98 + % Fe, drum lots .....63¢ to 80¢
Iron, electrolytic, unannealed, 325 mesh and coarser, 99 + % Fe .....35¢ to 37¢
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe.... 29¢ to 32¢
Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe.....90¢ to $1.75
Aluminum, 100, 200 mesh, carlots .....23¢ to 26¢
Antimony, 100 mesh ..... 36.05¢
Cadmium, 100 mesh $2.00
Chromium, 100 mesh and finer.... $1.025
Lead, 100, 200, & 300 mesh 18.50¢ to 23.50¢
Manganese, minus 325 mesh and coarser ..... 49¢
Nickel, 100 mesh ..... 51½¢
Silicon, 100 mesh ..... 26¢
Solder powder, 100 mesh..8½¢ plus metal
Stainless steel, 302, minus 100 mesh...75¢
Tin, 100 mesh ..... 90¢
Tungsten metal powder, 98%-99%, any quantity, per lb..... $3.05
Molybdenum powder, 99%, in 100-lb kegs, f.o.b. York, Pa., per lb. $2.65
Under 100 lb $2.90

COKE

Furnace, beehive (f.o.b. oven)	Net Ton
Connellsville, Pa.	$11.50 to $12.50
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	13.00 to 14.50
Foundry, Byproduct	
Chicago, del'd	$17.10
Chicago, f.o.b.	16.10
New England, del'd	19.50
Seaboard, Kearney, N. J., f.o.b.	17.35
Philadelphia, f.o.b.	16.75
Swedeland, Pa., f.o.b.	16.75
Buffalo, del'd	18.25
Ashland, Ohio, f.o.b.	15.50
Painesville, Ohio, f.o.b.	16.60
Erie, del'd	16.75
Cleveland, del'd	17.90
Cincinnati, del'd	15.39
St. Louis, del'd	18.03
Birmingham, del'd	15.00

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

	Carloads, Per 1000
No. 1, Ohio	$64.00
First quality, Pa., Md., Ky., Mo., Ohio	70.00
First quality, New Jersey	75.00
Sec. quality, Pa., Md., Ky., Mo, Ohio	64.00
Sec. quality, New Jersey	59.00
No. 2, Ohio	56.00
Ground fire clay, net ton, bulk....	10.00

Silica Brick

Pennsylvania and Birmingham ...	$70.00
Chicago District and Alabama	79.00
Silica cement, net ton (Eastern)...	12.00
East Chicago	13.00

Chrome Brick

	Per Net Ton
Standard chemically bonded, Balt., Plymouth Meeting, Chester	$59.00

Magnesite Brick

Standard, Balt. and Chester	$81.00
Chemically bonded, Baltimore	70.00

Grain Magnesite

Domestic, f.o.b. Balt. and Chester in bulk	$44.50
Domestic, f.o.b. Chewelah, Wash., in bulk	24.00
in sacks	28.00

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk, Midwest; add 10¢; Missouri Valley; add 20¢.. 10.55

WAREHOUSE PRICES

Base prices, delivered metropolitan areas, per 100 lb.

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
Philadelphia	$4.44	$5.18	$5.69	$4.73	$5.28	$4.79	$4.52	$4.78	$5.48	$8.32	$8.42	$9.83	$9.93
New York	4.67	5.67[1]	6.07	4.97	5.80	5.02	4.72	4.97	5.52	8.37	8.47	9.87	9.97
Boston	4.70	5.57[12]	5.50[12]	4.70	6.71	5.05	4.77	4.92	5.57	8.57	8.67	9.92	10.02
Baltimore	4.29	....	5.54	4.70	....	4.74	4.64	4.75	5.45	....	....	....	....
Norfolk	4.75	....	....	5.15	....	5.00	5.00	5.05	5.85	....	....	....	....
Chicago	3.65	....	....	4.05	5.05	4.25	4.10	4.10	4.95	8.05	8.15	9.30	9.40
Milwaukee	4.099	4.899[1]	5.249	4.199	....	4.399	4.249	4.249	5.10	8.399	8.399	9.649	9.649
Cleveland	3.95	4.55	5.238	4.188	5.00	4.25†	4.311	4.10	4.95	8.308	8.408	9.30	9.40
Buffalo	4.25	5.10	5.90	4.60	5.61[5]	4.85	4.40	4.40	4.95	8.05	8.15	9.30	9.40
Detroit	4.35	5.20	5.97	4.64	5.59	4.84†	4.72	4.50	5.22	8.46	8.56	9.69	9.79
Cincinnati	4.471	5.166	5.166	4.694	....	4.903	4.744	4.703	5.403	....	....	....	....
St. Louis	4.549	5.399[1]	5.974	4.649	5.774	4.899	4.699	4.699	5.424	8.524	8.624	9.774	9.874
Pittsburgh	4.25	5.10[1]	5.65	4.35	4.95	4.60	4.40	4.40	5.10	8.05	8.15	9.30	9.40
St. Paul	4.584[7]	5.434[1]	5.834[2]	4.684[7]	....	4.884[7]	4.734[7]	4.734[7]	4.826[6]	....	....	....	....
Omaha	4.868	6.118[1]	6.468	5.168	....	5.418	5.218	5.218	5.918	....	....	....	....
Indianapolis	4.51	5.29	5.84	4.61	5.46	4.86	4.66	4.65	5.36	....	....	....	....
Birmingham	4.45[11]	....	5.65	4.45[11]	....	4.65[11]	4.40[11]	4.40[11]	5.93	....	....	....	....
Memphis	4.82[11]	5.88[11]	6.37	5.02[11]	....	5.17[11]	4.97[11]	4.97[11]	5.88	....	....	....	....
New Orleans	*4.98[11]	6.29[1]	....	5.18[11]	....	5.33[11]	*5.03[11]	*5.13[11]	6.29[6]	....	....	....	....
Houston	5.30	....	6.60	5.25	....	5.35	5.15	5.30	6.60	8.75[16]	8.55[16]	9.70[16]	9.80[16]
Los Angeles	5.65	7.35[1]	7.10	5.95	8.70[5]	5.40	5.50	5.40	7.25[14]	9.90[15]	9.60[15]	11.35[15]	11.35[15]
San Francisco	5.20[8]	....	6.85	5.50[8]	....	....	....	....	7.35[10]	....	....	....	....
Seattle	5.30[4]	7.10[2]	6.70[2]	5.60[4]	....	5.45[4]	5.25[4]	5.45[4]	7.45[14]	....	9.75[6]	....	11.10[6]
Portland	5.30	....	6.90	....	....	....	....	....	....	....	....	....	....
Salt Lake City	6.25	....	7.50	6.75	....	6.10	6.25	6.35	7.40	....	....	....	....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1999 lb; strip, extras on all quantities; bars 1000 lb and over.

ALLOY BARS: 1000 to 1999 lb.

GALVANIZED SHEETS: 450 to 1499 lb.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999 lb; (8) 400 lb and over; (9) 450 to 1499 lb; (10) 500 to 999 lb; (11) 400 to 399 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 4999 lb; (16) 4000 lb and over.

* Add 46¢ for sizes not rolled in Birmingham.

† Up to ¾ in. thick and 90 in. wide.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums. Delivered prices do not include 3 pct tax on freight.

BASING POINT PRICES

Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	37.00	37.50	38.00	38.50	.....
Birdsboro	40.00	40.50	41.00	41.50	45.00
Birmingham	32.88–35.88	33.38–36.38	.....	.....	.....
Buffalo	35.50–39.25*	36.00–39.75*	36.50–40.25*	.....	.....
Chicago	35.50	36.00	36.50	37.00	.....
Cleveland	35.50–38.25*	36.00–38.75*	36.50–39.25*	.....	.....
Duluth	36.00	36.50	37.00	37.50	.....
Erie	35.50	36.00	36.50	37.00	.....
Everett	.....	45.00	45.50	.....	.....
Granite City	36.50	37.00	37.00	.....	.....
Neville Island	36.00	36.50	36.50	37.00	.....
Provo	37.00	37.50	.....	.....	.....
Sharpsville	36.00	36.50	36.50	37.00	.....
Steelton	37.00	.....	.....	.....	42.00
Struthers, Ohio	36.50	.....	.....	.....	.....
Swedeland	41.00	41.50	42.00	42.50	.....
Toledo	35.50	36.00	36.50	37.00	.....
Troy, N. Y.	37.00	37.50	38.00	38.50	42.00
Youngstown	36.00	36.50	36.50	37.00	.....

DELIVERED PRICES (BASE GRADES)

Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	$0.50 Arb.	.....	45.50	46.00	.....	.....
Boston	Steelton	4.82	.....	.....	.....	.....	46.82
Brooklyn	Bethlehem	3.00	40.00	40.50	41.00	41.50	.....
Brooklyn	Birdsboro	3.50	.....	.....	.....	.....	48.50
Cincinnati	Birmingham	4.87	37.75–40.75	38.25–41.25	.....	.....	.....
Jersey City	Bethlehem	1.84	38.84	39.34	39.84	40.34	.....
Jersey City	Birdsboro	2.33	.....	.....	.....	.....	47.33
Los Angeles	Provo	5.94	42.94	43.44	.....	.....	.....
Mansfield	Cleveland-Toledo	2.33	37.83–40.58*	38.33–41.08*	38.83–41.58*	39.33	.....
Philadelphia	Bethlehem	1.67	38.67	39.17	39.67	40.17	.....
Philadelphia	Swedeland	1.01	42.01	42.51	43 01	43.51	.....
Philadelphia	Birdsboro	1.49	41.49	41.99	42.49	42.99	46.49
Philadelphia	Steelton	2.15	39.15	.....	.....	.....	44.15
San Francisco	Provo	5.94	42.94	43.44	.....	.....	.....
Seattle	Provo	5.94	42.94	43.44	.....	.....	.....
St. Louis	Granite City	0.75 Arb.	37.25	37.75	37.75	.....	.....

* Republic Steel Corp. price. Basis: Average price of No. 1 hvy. mlt. steel scrap at Cleveland or Buffalo respectively as shown in last week's issue of THE IRON AGE. Price is effective until next Sunday midnight.

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson, Ohio—$45.50; f.o.b. Buffalo — $46.75. Add $1.25 per ton for each additional 0.50 pct Si, up to 12 pct. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorous $44.00 per gross ton, f.o.b. Lyles, Tenn. Delivered to Chicago, $49.49. High phosphorous charcoal pig iron is not being produced.

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size, f.o.b. Baltimore, Philadelphia, New York, Birmingham, Rockwood, Tenn.

Carload lots (bulk)	$135.00
Less ton lots (packed)	157.00
Delivered Pittsburgh	140.25

$1.70 for each 1% above 82% Mn; penalty, $1.70 for each 1% below 78%.

Briquets—Cents per pound of briquet, freight allowed, 66% contained Mn.

	Eastern	Central	Western
Carload, bulk	7.00	7.25	7.80
Ton lots	8.00	8.60	10.50
Less ton lots	8.40	9.00	10.90

Spiegeleisen

Contract prices, gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads	$46.00	$47.00
F.o.b Pittsburgh	50.00	51.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, f.o.b. shipping point, freight allowed, eastern zone.

96% min. mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk	30
L.c.l. lots	32

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	32
Ton lots	34
Less ton lots	36

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, f.o.b. shipping point, freight allowed, eastern zone.

	Carloads	Ton	Less
0.06% max. C, 0.06% P, 90% Mn	21.00	22.10	22.70
0.10% max. C	20.50	21.60	22.20
0.15% max. C	20.00	21.10	21.70
0.30% max. C	19.50	20.60	21.20
0.50% max. C	19.00	20.10	20.70
0.75% max. C, 7.00% max. Si	16.00	17.10	17.70

Silicomanganese

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed, 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk	6.65
Ton lots	7.70
Briquet, contract basis, carlots, bulk freight allowed, per lb of briquet	6.75
Ton lots	7.75
Less ton lots	8.15

Silvery Iron (electric furnace)

Si 14.01 to 14.50%, $69.00 f.o.b. Keokuk, Iowa; $70.00 f.o.b. Niagara Falls. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add 50¢ per ton for each 0.50 pct Mn over 1 pct.

Silicon Metal

Contract price, cents per pound contained Si, lump size, f.o.b. shipping point, freight allowed, for ton lots packed.

	Eastern	Central	Western
96% Si, 2% Fe	16.50	17.85	19.60
97% Si, 1% Fe	16.00	18.25	20.00

Ferrosilicon Briquets

Contract price, cents per pound of briquet, bulk, f.o.b. shipping point, freight allowed to destination, 40% Si. 1 lb Si briquets.

	Eastern	Central	Western
Carload, bulk	4.25	4.50	4.70
Ton lots	5.25	5.85	6.15
Less ton lots	5.65	6.25	6.55

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
25% Si	15.00	15.65	15.90
50% Si	7.80	8.30	8.50
75% Si	10.00	10.30	11.05
80-90% Si	11.30	11.60	12.35
90-95% Si	12.80	13.10	13.80

Ferrochrome (65-72% Cr, 2% max. Si)

Contract prices, cents per pound, contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
0.06% C	23.00	23.40	24.00
0.10% C	22.50	22.90	23.50
0.15% C	22.00	22.40	23.00
0.20% C	21.75	22.15	22.25
0.50% C	21.50	21.90	22.00
1.00% C	21.00	21.40	21.50
2.00% C	20.50	20.90	21.00
65-69% Cr, 4-9% C	15.60	16.00	16.15
62-66% Cr. 4-6% C. 6-9% Si.	16.60	17.00	17.15

Briquets — Contract price, cents per pound of briquet, f.o.b. shipping point, freight allowed, 60% chromium.

	Eastern	Central	Western
Carload, bulk	9.85	10.10	10.20
Ton lots	10.75	11.65	12.25
Less ton lots	11.15	12.05	12.65

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chrominum contained, lump sie, f.o.b. shipping point, freight allowed.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

	Eastern	Central	Western
Carload	16.70	17.10	17.25
Ton lots	17.90	19.20	20.00
Less ton lots	18.60	19.90	20.70

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

	Eastern	Central	Western
Carload	21.00	21.40	21.50
Ton lots	22.35	23.00	24.20
Less ton lots	23.35	24.00	25.20

Chromium Metal

Contract prices, cents per lb, chromium contained, carload, f.o.b. shipping point, freight allowed, 97% min. Cr, 1% max. Fe.

	Eastern	Central	Western
0.20% max. C	83.50	85.00	86.25
0.50% max. C	79.50	81.00	82.25
9.00% min. C	79.50	81.00	82.25

Calcium—Silicon

Contract price per lb of alloy, lump, f.o.b. shipping point, freight allowed.

30-35% Ca, 60-65% Si, 3.00% max. Fe or 28-32% Ca, 60-65% Si, 6.00% max. Fe.

	Eastern	Central	Western
Carloads	14.00	14.50	16.55
Ton lots	16.10	16.85	19.00
Less ton lots	17.10	17.85	20.00

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, f.o.b. shipping point, freight allowed.

16-20% Ca, 14-18% Mn, 53-59% Si.

	Eastern	Central	Western
Carloads	15.50	16.00	18.05
Ton lots	17.60	18.45	20.20
Less ton lots	18.60	19.45	21.20

Calcium Metal

Eastern zone contract prices, cents per pound of metal, f.o.b. shipping point, freight allowed. Add 1.5¢ for central zone; 3.5¢ for western zone.

	Cast Turnings	Distilled
Ton lots	$1.60	$2.35 $2.95
Less ton lots	1.95	2.70 3.75

CMSZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

	Eastern	Central	Western
Ton lots	16.00	17.10	19.05
Less ton lots	16.75	17.85	19.80

SMZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed. 60-65% Si, 5-7% Mn. 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

	Eastern	Central	Western
Ton lots	14.25	15.35	17.30
Less ton lots	15.00	16.10	18.05

Other Ferroalloys

Ferrotungsten, standard, lump or ¼ x down, packed, f.o.b. plant Niagara Falls, Washington, Pa. York, Pa., per pound contained W, 5 ton lots, freight allowed.. $2.50

Ferrovanadium, 35-55%, contract basis, f.o.b. plant, freight allowances, per pound contained V.

Openhearth	$2.70
Crucible	$2.80
High speed steel (Primos)	$2.90

Vanadium pentoxide, 88-92% V_2O_5 technical grade, contract basis, per pound contained V_2O_5 $1.10

Ferrocolumbium, 50-60%, contract basis, f.o.b. plant, freight allowed, per pound contained Cb

Ton lots	$2.50
Less ton lots	$2.55

Ferromolybdenum, 55-75%, f.o.b Langeloth, Washington, Pa., per pound contained Mo. 95¢

Calcium molybdate, 40-45%, f.o.b Langeloth, Washington, Pa., Per pound contained Mo. 80¢

Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per pound contained Mo. 80¢

Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo. 80¢

Ferrotitanium, 40-45%, 0.10% C max., f.o.b. Niagara Falls, N. Y. ton lots, per pound contained Ti $1.23

Less ton lots $1.35

Ferrotitanium, 20-25%, 0.10% C max., ton lots, per pound contained Ti $1.35

Less ton lots $1.40

High carbon ferotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads, per net ton $142.50

Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. (Siglo) Tenn., $3 unitage per gross ton $65.00

Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.

Carload lots	17.00¢

Zirconium, 12-15%, contract basis, lump, f.o.b. plant, freight allowed, per pound of alloy

Carload, bulk	5.50¢

Alsifer, 20% Al, 40% Si, 40% Ft, contract basis, f.o.b. Suspension Bridge, N. Y.

Carload	6.50¢
Ton lots	7.00¢

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound

Car lots	9.00¢
Ton lots	9.75¢

Boron Agents

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed. Ferroboron, 17-20% min. B, 1.50% max Si, 0.50% max. Al, 0.50% max. C.

	Eastern	Central	Western
Less ton lots	$1.30	$1.3075	$1.339

Manganese — Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max C.

Ton lots	$1.89	$1.903	$1.936
Less ton lots	2.01	2.023	2.044

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

Less ton lots	$2.10	$2.1125	$2.1445

Silcaz, contract basis, f.o.b. plant freight allowed, per pound.

Carload lots	35¢

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 50 lb and over.

No. 1	87.5¢
No. 6	60¢
No. 79	45¢

Bortram, f.o.b. Niagara Falls

Ton lots, per pound	45¢
Less ton lots, per pound	50¢

Carbortam, f.o.b., Suspension Bridge, N. Y., freight allowed, Ti 15—17%, B 0.90—1.15%, Si 2.5—3.0% Al 1.0—2.0%.

Ton lots, per pound	8.0¢

ENGINE EFFICIENCIES UNDREAMED OF A YEAR AGO TODAY!

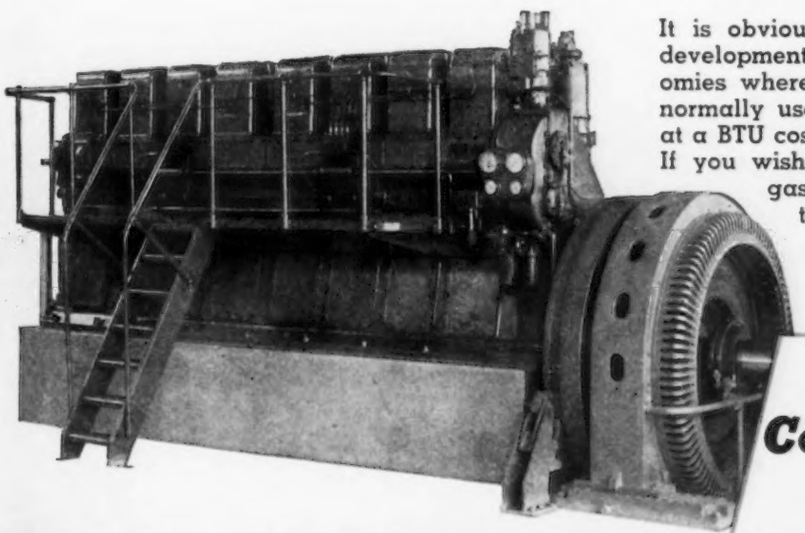
HERE at Cooper-Bessemer, development of the Gas-Diesel engine has been a continuing program ever since we introduced this revolutionary type of Diesel early in 1945. *Now* we are able to announce and *guarantee* over-all thermal efficiencies unapproached by even the best known performance of oil-burning Diesels — a development of major significance to many power users in various fields.

SENSATIONAL EFFICIENCIES REGARDLESS OF LOAD!

In contrast to original gas-Diesel performance, amazingly high efficiencies are held *throughout the entire load range!* The following chart compares, at four different loads, the normal efficiency of a good spark-ignited gas engine, a supercharged oil-burning Diesel, an ordinary supercharged gas-Diesel, and a *new* Cooper-Bessemer supercharged gas-Diesel.

TOTAL BTU/BHP/HR

ENGINE TYPE	100% load	75% load	50% load	25% load
Spark-ignited gas engine	9,500	10,000	12,000	17,800
Supercharged oil Diesel	7,400	7,450	7,950	9,250
Supercharged gas-Diesel (ordinary)	7,200	8,600	12,000	20,500
C-B supercharged gas-Diesel (new)	6,400	6,750	7,350	8,950



It is obvious from the chart that this recent development opens the way to important economies wherever spark-ignited gas engines are normally used, *wherever* gas fuel is available at a BTU cost even approaching that of fuel oil. If you wish to investigate the application of gas-Diesels for your particular conditions and needs, the nearest Cooper-Bessemer office will gladly give you full cooperation.

The **Cooper-Bessemer** *Corporation*

MOUNT VERNON, OHIO — GROVE CITY, PENNA.

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Fatigue Cracks

BY C. T. POST

Scooter Colonel

• • With the deft sweep of a Sally Rand fan, Uncle Joe Stalin swished aside the iron curtain momentarily the other day to give reporters a peek at his new jet planes. "All the most widely known Russian plane designers," read the dispatches, "had new models flying."

Flashing back to 1943, we find the Russians feverishly taking delivery of Bell Aircobras, ace pursuit plane of the day. Stationed at the Bell plant to see that everything is all right before the planes took off over the North Pole are an appropriate number of Russian air force representatives. Among them is a test pilot—a colonel—who performs his duties assiduously. Not content to merely check the performance of planes, the colonel has equipped himself with a motor scooter, and darts up, down, and around the Bell plant and airfield incessantly, not missing a trick. It happens that, about the same time, Bell has under flight test America's first jet plane, later known as the P-59, and the colonel gawks so hard that he almost rams the scooter into a hangar wall.

Funny thing, the boys say that the new Russian jet plane sensation is almost an exact counterpart of the P-59, now rated by the military as obsolete. That's always the way with all those fan dances. The boys never see as much as they expect.

Impact

• • After giving our all these many years for Chilton Co., Admiral of the business paper fleet, we were no end delighted to detect an apparent salute from the Navy Department the other day. A release from Washington declares that the *USS Chilton* is floating headquarters for the scientific resurvey of Bikini atoll, where the atom bomb exploded last summer.

Sic Transit Gloria

• • Chrysler Corp. probably didn't know that it was going to receive a lot of incidental publicity for its medium-priced automobile when it dubbed its wartime aircraft engine plant (largest industrial plant in the world under one roof) the "Dodge-Chicago plant." But, with engine production only a memory, the name has stuck through Congressional investigations of porcelain enameled houses and rear-engine automobiles, the very mention of which probably gives Chrysler the creeps. But the tag finally is beginning to peel off. An advertisement for the National Machine Tool Show, to be held next week, shoves Dodge into the back seat, mentioning the site as the "Chicago-Dodge plant." Next thing we know, it'll be the "Chicago-Tucker plant," and we can count reconversion as complete.

Signal Flags

• • We've dumped overboard those Naval communications experts who two weeks ago tore to shreds the signal flag displayed on the world's largest battleship per the Luria Brothers July 31 advertisement. We received the following communique at 1513 yesterday

from Melton Chittenden, erstwhile chief signalman on some of the Navy's mightiest, who now is increasing the circulation of your favorite family journal in the North Atlantic coastal area:

> *"The signal flags flying at the port yardarm are in proper order. It would seem that there are three signals being sent to all ships, one of which is understood. The two single flags flying inboard are not yet understood. The single flag at the fore truck could either be a guide flag or a warning flag to indicate the ship is coming on the range to fire. However if the latter were the case there would be no reason for the single flag at the starboard yardarm. Therefore, we can assume that it is a guide flag at the dip to indicate that the guide is not on station, with the single flag at the starboard yardarm indicating that our battleship is preparing to receive another ship along side or to go along side another ship."*

Sounds reasonable enough. But we're still curious as a spinster on a party line to know what the message is.

Dear Editor:

SWEET MUSIC

Sir:

I always read all the advertisements from the front page of THE IRON AGE slowly and carefully. I do this because I know that sooner or later, but surely, I will come to the editorial. Not that the editorial is not good, because it is very good, but it is solemn and serious, not light and fanciful like a steel mill advertising light sheets, for instance. I know that I must read it very carefully and look up all the big words because the editorial is likely to affect my grandchildren. This I did until the issue of July 31. I crept through "Rust Resisting Silos," "X marks the spot" and then there was "Fatigue Cracks" followed by "Dear Editor" which last I read eagerly even when I don't understand what it is all about and it wouldn't be any of my business if I did. Led on happily by these entertaining items I confronted the editorial, read it without effort and believe I understand it. The only other step I can think of to make THE IRON AGE perfect would be for Williams to draw two cartoons each issue. You may conclude from the above that I am pleased with the new arrangement.

CHARLES C. FINN
John Finn Metal Works
Seattle

WET GRINDING

Sir:

The second item in Newsfront of the July 24 issue reports development of high speed wet grinding equipment that grinds both sides of either sheet or strip metal at one time. We would like further detailed information relative to this equipment and will appreciate any information you may be in a position to furnish us.

D. E. MERRIMAN
Purchasing Agent
The Stanley Works
New Britain, Conn.

● This grinder was described in detail on p. 65 of the Aug. 14 issue.—Ed.

OXYGEN MAKERS MEET

Sir:

At a meeting of the Independent Oxygen Manufacturers' Assn. in San Francisco, a committee was appointed to handle a coordinated merchandising program for the association. One of the aims of the merchandising committee is to bring to the attention of the members of the association new products that come into the welding industry. We're very anxious to hear from those men who develop new products so that our members can be among the first to offer such new

Check these points of
EXTRA VALUE—EXTRA PERFORMANCE
in the new CLEARING TYPE S PRESSES

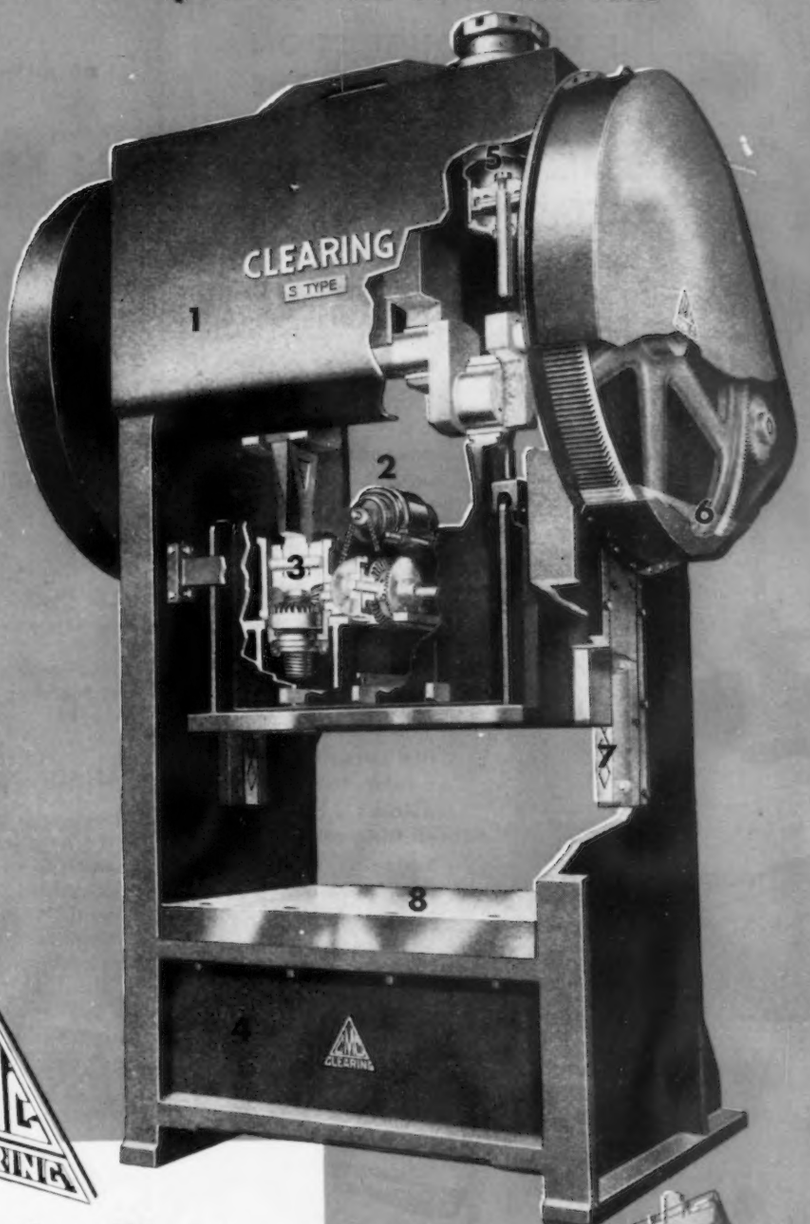
Capacities from 60 to 250 Tons

1 Welded steel frame, stress relieved by heat

2 Motorized adjustment

3 Barrel type adjustment—no side thrust on threads

4 Bed machined to receive cushions



5 Air counterbalance cylinders as standard equipment

6 Twin drive, with gears running in oil

7 Long gibs, removable and adjustable

8 Extremely wide choice of bed and stroke dimensions

See it at the Show

Clearing's new Type S press will be one of the features of a comprehensive exhibit of the most modern press equipment—Machine Tool Show, Chicago, September 17 to 26th:

in Booth 11

MECHANICAL AND HYDRAULIC PRESSES ★ 45 TONS CAPACITY AND LARGER

CLEARING

THE WAY TO EFFICIENT MASS PRODUCTION

CLEARING MACHINE CORPORATION

6499 W. 65th Street • Chicago 38, Illinois

products to their customers. To that end, I wonder whether you will run in your magazine some kind of a reading notice, inviting developers of new products for the welding industry to get in touch with Mr. Joseph Wagner, chairman of the merchandising committee, 3300 Lakeside Ave., Cleveland 14. I'm sure that our members will appreciate your doing this for them.

I. F. FAUSEK
President
Independent Oxygen Manufacturers' Assn., St. Louis

GEAR RATIOS

Sir:

Would you kindly send us information or a chart on gear ratios for specific surface feet for the 1¼-in. Model F Gridley automatic screw machine.

N. J. CANALICHIO
J. F. Machine Works
Philadelphia

● The handbook of the National Acme Co. covering the Model F and G Gridley multiple spindle automatic screw machines, has been sent to you. On p. 82 you will find the specific chart for the 1¼-in. Model F machine.—Ed.

METAL INDUSTRIES CATALOG

Sir:

Please tell us where we can obtain a copy of the "Metal Industries Catalog."

JOHN L. WILLIAMS
John Williams Steel Works
Jackson, Tenn.

● The catalog is published by the Rheinhold Publishing Co., 330 W. 42nd St., New York.—Ed.

CANADA NEEDS PRESSES

Sir:

We are very anxious to learn the names of well known and reputable press people. We require immediately several 300-ton capacity presses with a large bed area. They will require air cushion equipment and a stroke up to about 12 to 18 in., useful area of the bed being approximately 84x60 in. If you could give us this information, we would greatly appreciate it.

D. A. ROSS
Lines Bros. (Canada) Ltd.
Montreal

REQUEST FROM HUNGARY

Sir:

Much as I deplore molesting with such a letter, I am forced to turn to your association in my great need. I possessed a well stocked iron store in a small provincial town. The war and the fierce fighting which raged for six months in this part of Hungary destroyed my house, home and shop. My husband has since died of injuries received during the shelling of our homes. I must try to reestablish a business on my own. Therefore, I turn to my fellow workers in America to beg for assistance with which

to commence obtaining fittings and stock to open up a shop once more. Trusting my request will meet with understanding sympathy, I remain respectfully,

(MRS.) IMRE HOLLOSY
Mor, Fejer megye
Hungary

SELECTING CAST IRONS

Sir:

I should like to secure a copy of the article, "A Practical Method of Selecting the Correct Type of Cast Iron" by Geist and Hambley, that appears in the issues of Oct. 17, Oct. 24, and Oct. 31, 1946.

W. A. SPINDLER
University of Michigan
Ann Arbor, Mich.

BIMETAL SHEETS

Sir:

For manufacturing small thermal overload relays, we are in need of bimetal in sheets or strips with a thickness between 0.6-1.5 mm.... We would appreciate receiving some addresses of American manufacturers of this article.

A. DE HOOP N. V.
Rotterdam

● We are forwarding names of possible sources of supply and suggest you send your specific requirements to them.—Ed.

NO VETO

Sir:

This is to acknowledge with many thanks the receipt of the tear sheets which you were kind enough to send me concerning spot tests. I regret owing to exchange regulations I am unable to become a subscriber, but I hope this will not deprive me of the services of the Readers Department. With assurances of my appreciation, I am

MYRON ACKLAND
Senior Research Engineer
Ural Institute of Ferrous Metals
Moscow, USSR

NONFERROUS SCRAP

Sir:

We refer to the article in the July 24 issue, p. 96, under the heading of "Distillation of Scrap." Any information that you can give us in the subject matter will be appreciated.

B. GOODMAN
H. Goodman & Sons
Springfield, Mass.

● We have requested Intercontinental Engineers, Inc., 176 W. Adams St., Chicago 3, to send you a copy of their Bulletin 124, which contains information on the distillation of zinc from brass and similar alloys. —Ed.

STAINLESS STEEL PRODUCERS

Sir:

Will you kindly mail us a complete list of stainless steel manufacturers of raw materials. We are particularly

interested in stainless steel coil manufacturers. We also would like to receive the name of manufacturers who are capable of rerolling stainless steel bars.

S. WEINER
Eastern Metals Corp.
Newark, N. J.

● Lists of producers have been sent.—Ed.

MACHINE TOOL REPORTS

Sir:

Will you please forward a copy of the statistical reports appearing on p. 120 and 121 of your June 19 issue covering machine tool exports for the year 1946 and the first quarter of 1947.

E. ETHE
Steel Industry Analyst
Econometric Institute Inc.
New York

PREFORM ROLLING

Sir:

Please advise if I can secure six reprints of the article "Small Sections Contoured by Preform Rolling," which appears on p. 54 of the June 26 issue.

J. FRANK GEORGE, JR.
Vice President
Gary Steel Products Corp.
Norfolk, Va.

● Tear sheets have been mailed. The article was not reprinted.—Ed.

STAINLESS STRIP WANTED

Sir:

Kindly inform me where I could buy 6 to 12 ft of the best steel there is; the same quality as the cutlery grades of stainless steel. I want it 2½ in. wide ⅛ to 3/16 in. thick, smooth as glass.

JAMES H. ASHMEAD
Lake George, N. Y.

● We are sending you names of firms in the Buffalo area from whom you can obtain the stainless steel strip which you describe.—Ed.

WAR SURPLUS DISPOSAL

Sir:

We are very anxious to obtain a copy of the article entitled "Details Disposal of U. S. War Items in European Theatre" as appearing in the Nov. 21, 1946, issue of THE IRON AGE.

M. B. HALLERAN
War Surplus Engineering Service
Los Angeles

FORGING FAILURE

Sir:

We were very much interested in the article "Forging Failure Caused by Carbon Pick-Up" by Martin B. Graham, in the July 24 issue. Would you kindly send us four reprints of this article?

J. H. SIEBERT
Secretary
Michigan Forging Co.
Detroit